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Central Radio Propagation Laboratory

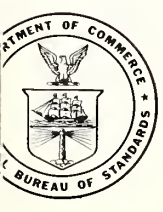
IONOSPHERIC PREDICTIONS

for

August

1964

TB 11-499-17/TO 31-3-28



U. S. DEPARTMENT of COMMERCE
National Bureau of Standards
Number 17/Issued May 1964

U.S. DEPARTMENT OF COMMERCE
Luther H. Hodges, Secretary

NATIONAL BUREAU OF STANDARDS
A. V. Astin, Director

Central Radio Propagation Laboratory

Ionospheric Predictions

for August 1964

Number 17
Issued
May 1964

[Formerly "Basic Radio Propagation Predictions," CRPL Series D.]

The CRPL Ionospheric Predictions are issued monthly as an aid in determining the best sky-wave frequencies over any transmission path, at any time of day, for average conditions for the month. Issued three months in advance, each issue provides tables of numerical coefficients that define the functions describing the predicted worldwide distribution of foF2 and M(3000)F2 and maps for each even hour of universal time of MUF(Zero)F2 and MUF(4000)F2.

NOTE: Department of Defense personnel see back cover.

Use of funds for printing this publication approved by the Director of the Bureau of the Budget (June 19, 1961).

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Price 15 cents.

Annual subscription (12 issues) $1.50 (50 cents additional for foreign mailing).

National Bureau of Standards

The functions of the National Bureau of Standards are set forth in an Act of Congress, March 3, 1901, as amended. These include the development and maintenance of the national standards of measurement and the provision of means and methods for making measurements consistent with these standards; the determination of physical constants and properties of materials; the development of methods and instruments for testing materials, devices, and structures; advisory services to government agencies on scientific and technical problems; invention and development of devices to serve special needs of the Government; and the development of standard practices, codes, and specifications. The work includes basic and applied research, development, engineering, instrumentation, testing, evaluation, calibration services, and various consultation and information services. The Bureau also serves as the Federal technical research center in a number of specialized fields.

Central Radio Propagation Laboratory

The Central Radio Propagation Laboratory at Boulder, Colorado, is the central agency of the Federal Government for the collection, analysis, and dissemination of information on propagation of radio waves at all frequencies along the surface of the earth, in the atmosphere, and in space, and performs scientific studies looking toward new techniques for the efficient use and conservation of the radio spectrum. To carry out this responsibility, the CRPL—

1. Acts as the central agency for the conduct of basic research on the nature of radio waves, the pertinent properties of the media through which radio waves are transmitted, the interaction of radio waves with those media, and on the nature of radio noise and interference effects. This includes compilation of reports by other foreign and domestic agencies conducting research in this field and furnishing advice to government and nongovernment groups conducting propagation research.

2. Performs studies of specific radio propagation mechanisms and performs scientific studies looking toward the development of techniques for efficient use and conservation of the radiofrequency spectrum as part of its regular program or as requested by other government agencies. In an advisory capacity, coordinates studies in this area undertaken by other government agencies.

3. Furnishes advisory and consultative service on radio wave propagation, on radiofrequency utilization, and on radio systems problems to other organizations within the United States, public and private.

4. Prepares and issues predictions of radio wave propagation and noise conditions and warnings of disturbances in these conditions.

5. Acts as a central repository for data, reports, and information in the field of radio wave propagation.

6. Performs scientific liaison and exchanges data and information with other countries to advance knowledge of radio wave propagation and interference phenomena and spectrum conservation techniques, including that liaison required by international responsibilities and agreements.

Introduction

The "Central Radio Propagation Laboratory Ionospheric Predictions" is the successor to the former "Basic Radio Propagation Predictions," CRPL Series D. To make effective use of these predictions, National Bureau of Standards Handbook 90, "Handbook for CRPL Ionospheric Predictions Based on Numerical Methods of Mapping," should be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402, price 40 cents. This Handbook includes required additional data, nomographs and graphical aids, as well as methods for the use of the predictions. The Handbook supersedes the obsolete NBS Circular 465.

The basic prediction appears in tables 1 and 2, presenting predicted coefficients for foF2 and M(3000)F2 defining the numerical map functions describing the predicted worldwide variation of these characteristics. With additional auxiliary information, these coefficients may be used as input data for electronic computer programs solving specific high frequency propagation problems. The basic equations, their interpretation, and methods of using the numerical maps are described in two papers by W. B. Jones and R. M. Gallet, "The Representation of Diurnal and Geographic Variations of Ionospheric Data by Numerical Methods," Volume 66D, Number 4, July–August 1962, pages 419–438, and "Methods for Applying Numerical Maps of Ionospheric Characteristics," Volume 66D, Number 6, November–December 1962, pages 649–662, both in the Journal of Research of the National Bureau of Standards, Section D. Radio Propagation. The predicted numerical map coefficients of tables 1 and 2 may be purchased in the form of a tested set of punched cards. Write to the Prediction Services Section, Central Radio Propagation Laboratory, National Bureau of Standards, Boulder, Colorado, to arrange for the purchase of the set of punched cards and for further information and assistance in the application of computer methods and numerical prediction maps to specific propagation problems.

The graphical prediction maps, derived from the basic prediction, are provided for those unable to make use of an electronic computer. Figures 1 to 12 present world maps of MUF (Zero) F2 and MUF(4000)F2 for each even hour of universal time. Figures 13 to 16 present the same predictions for hours 00 and 12 universal time for the North and South Polar areas. Predicted polar maps for each even hour of universal time may be obtained by special arrangements with the Central Radio Propagation Laboratory. Handbook 90 describes methods for including regular E–F1 propagation. Figure A is a graph of predicted and observed Zürich sunspot numbers which shows the recent trend of solar activity. Table A lists observed and predicted Zürich smoothed relative sunspot numbers and includes the sunpot number used for the current prediction.

Members of the U.S. Army, Navy, or Air Force desiring the Handbook and the Ionospheric Predictions should send requests to the proper service address; for the Navy: The Director, Naval Communications, Department of the Navy, Washington, D.C., 20350; for the Air Force: Directorate of Command Control and Communications, Headquarters, United States Air Force, Washington, D.C., 20330. Attention: AFOCCAA. Army personnel should refer to the Handbook as TM-11–499 and to the monthly predictions as TB 11–499–( ), predictions for the month of August 1964 being distributed in May 1964 and designated TB 11–499–(17), and should requisition these through normal publication channels.

Information concerning the theory of radio wave propagation and such important problems as absorption, field intensity, lowest useful high frequencies, etc., is given in National Bureau of Standards Circular 462, "Ionospheric Radio Propagation." A revised work is in preparation which will be announced in the Ionospheric Prediction series when available. Additional information about radio noise may be found in C.C.I.R. Report Number 65, "Revision of Atmospheric Noise Data," International Telecommunication Union, Geneva, 1957.

Reports to this Laboratory of experience with these predictions would be appreciated. Correspondence should be addressed to the Prediction Services Section, Central Radio Propagation Laboratory, National Bureau of Standards, Boulder, Colorado.

Table A

Observed and Predicted Zurich Smoothed Relative Sunspot Numbers

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1952	43	42	39	36	34	32	31	29	28	28	27	26
	(53)	(51)	(52)	(52)	(52)	(52)	(51)	(49)	(46)	(43)	(38)	(33)
1953	24	22	20	19	17	15	13	12	11	10	9	7
	(30)	(29)	(27)	(24)	(22)	(21)	(20)	(18)	(18)	(17)	(16)	(15)
1954	6	6	4	3	4	4	5	7	8	8	10	12
	(14)	(12)	(11)	(10)	(10)	(9)	(8)	(8)	(8)	(10)	(10)	(11)
1955	14	16	20	23	29	35	40	46	55	64	73	81
	(12)	(14)	(14)	(13)	(16)	(18)	(22)	(27)	(30)	(31)	(35)	(42)
1956	89	98	109	119	127	137	146	150	151	156	160	164
	(48)	(53)	(60)	(68)	(77)	(89)	(95)	(105)	(119)	(135)	(147)	(150)
1957	170	172	174	181	186	188	191	194	197	200	201	200
	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)
1958	199	201	201	197	191	187	185	185	184	182	181	180
	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)
1959	179	177	174	169	165	161	156	151	146	141	137	132
	(150)	(150)	(150)	(150)	(146)	(143)	(141)	(142)	(141)	(139)	(137)	(137)
1960	129	125	122	120	117	114	109	102	98	93	88	84
	(136)	(135)	(133)	(130)	(125)	(120)	(118)	(115)	(110)	(108)	(105)	(100)
1961	80	75	69	64	60	56	53	52	52	51	50	49
	(100)	(90)	(90)	(90)	(85)	(85)	(80)	(75)	(70)	(70)	(65)	(60)
1962	45	42	40	39	39	38	37	35	33	31	30	30
	(60)	(50)	(48)	(45)	(42)	(37)	(34)	(31)	(29)	(28)	(27)	(34)
1963	29	30	30	29	29	28	28	27				
	(31)	(28)	(26)	(25)	(25)	(25)	(23)	(21)	(20)	(18)	(18)	(17)
1964												
	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)*				

Note: Final numbers are listed through June 1963, the succeeding values being based on provisional data. The predicted numbers are in parentheses.

* Number used for predictions in this issue.

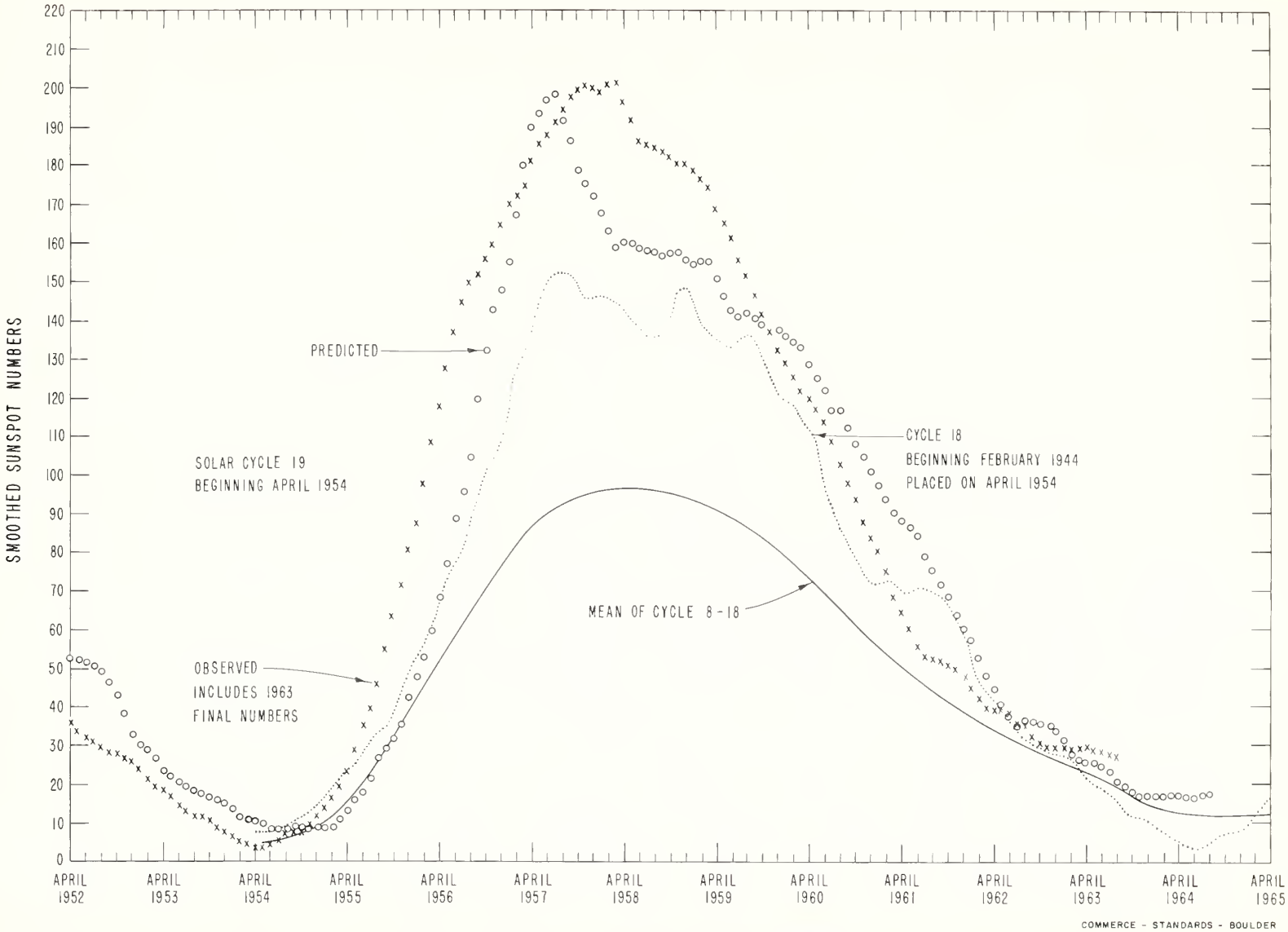


FIG. A. PREDICTED AND OBSERVED SUNSPOT NUMBERS

TABLE I

TIME VARIATION

GEOGRAPHICAL VARIATION

Harmonic		0	1		2		3		4			
	K \ S	0	1		2		3		4		5	6
I	0	6.1842380E 00	1.7426050E 00	1.9388775E 00	-6.4069406E-01	1.6421427E-01	-3.5627649E-01	-4.1478753E-01	2.5165587E-01	-1.0870700E-01		
	1	1.2108983E 00	1.6572708E 00	-1.1910435E 00	1.3289051E 00	-1.2461922E 00	3.4781765E-01	-2.9106816E-01	1.2760688E-01	4.6991739E-01		
	2	-7.4687891E 00	1.9386202E 00	9.2770851E 00	9.6961228E 00	-4.0598568E 00	-4.5337095E-01	-1.3245485E 00	-1.1955447E 00	2.9236871E 00		
	3	6.8766688E 00	4.6664881E 00	2.2331148E 01	-4.1109029E 00	1.8352899E 00	-1.7232921E 00	4.5290547E 00	1.9694489E 00	-2.2066029E-01		
	4	1.3139416E 01	-5.2059381E 01	-1.0530656E 02	-4.5093073E 01	3.6671826E 01	1.4014022E 01	1.8007983E 01	6.4025300E 00	-2.3942787E 01		
	5	-5.4072479E 01	-7.1156574E 01	-1.3410346E 02	-2.2412677E 01	1.3506588E 01	6.9437051E-01	-2.0473315E 01	-1.1163546E 01	-1.0762316E 01		
	6	-2.3324046E 01	1.9926213E 02	3.7829227E 02	8.2561775E 01	-1.2715884E 02	-6.3367151E 01	-5.4093527E 01	-1.7097380E 01	1.7621125E 01		
	7	1.2530946E 02	1.9748877E 02	3.9865547E 02	8.6801176E 01	-5.1421964E 01	1.1832208E 01	4.6182004E 01	2.2825828E 01	3.4497185E 01		
	8	2.4835056E 01	-3.3027271E 02	-6.3784543E 02	-6.5002961E 01	2.1532878E 02	1.1676902E 02	7.1175231E 01	1.9271111E 01	-1.2013904E 02		
	9	-1.2316693E 02	-2.1262045E 02	-3.0457787E 02	-9.9934002E 01	6.1603298E 01	-2.1576859E 01	-4.8875566E 01	-2.0855056E 01	-3.8781056E 01		
	10	-1.0490015E 01	2.5792527E 02	5.1987913E 02	1.8857417E 01	-1.7496118E 02	-9.9405068E 01	-4.2940851E 01	-8.0268644E 00	9.2721468E 01		
	11	4.4542035E 01	7.9084444E 01	1.0863906E 02	3.8327095E 01	-2.4359869E 01	1.0471435E 01	1.8956640E 01	7.1061069E 00	1.4534432E 01		
	12	6.1751372E-01	-7.7844957E 01	-1.6388885E 02	-2.5876266E-01	5.4723912E 01	3.1887637E 01	9.5706762E 00	3.7387670E-01	-2.8260302E 01		
II	13	1.2117976E-02	1.8963066E-02	1.2659306E-01	-4.2191559E-02	-8.3283997E-02	2.9080379E-02	4.4539531E-02	8.4412169E-03	-3.7761941E-03		
	14	1.3826993E-01	-7.7323841E-02	4.4879653E-01	-2.7637793E-01	1.1057632E-01	-5.7306656E-02	-1.5459040E-02	7.2032846E-02	-8.5987045E-02		
	15	-2.3770712E-01	-3.5331771E-01	1.1760647E 00	-5.7186306E-01	-3.8750538E-02	-1.3851901E-01	-4.6324017E-01	-2.0376556E-02	-5.3404406E-02		
	16	-1.3945333E 00	-1.4132443E 00	-4.6990487E 00	-4.9455881E 00	-1.2232709E 00	-9.6187096E-01	-3.7438426E-01	7.3545376E-01	-6.1393120E-01		
	17	-8.4727042E 00	-2.3687847E 00	-3.2801947E 00	3.9517364E 00	8.7866557E-01	1.1784621E 00	-2.6956879E 00	-4.4567031E-01	1.1521303E 00		
	18	-1.3820730E 01	-4.9498811E 00	-8.6619536E 00	4.0129611E-01	-6.0618631E 00	1.7429408E-01	1.2856284E 00	-4.1614696E-01	2.5291328E 00		
	19	1.4731496E 01	7.9460260E 00	-1.4081732E 01	3.5589045E 00	3.4393140E 00	-5.7863392E-02	6.4565102E 00	2.5646502E-01	6.3885915E-01		
	20	6.0151836E 01	4.7713257E 01	8.6732364E 01	6.6193274E 01	1.9634373E 01	9.3809173E 00	4.3512273E 00	-8.0794319E 00	8.7808436E 00		
	21	1.1109308E 02	4.3324551E 01	1.9941193E 01	-4.2194508E 01	1.1134423E 01	-4.3082014E 00	3.0424733E 01	5.0879900E 00	-1.2779146E 01		
	22	1.3764378E 02	6.0128561E 01	4.6624052E 01	2.2064384E 01	5.4984576E 01	6.4748262E 00	-5.6111403E 00	-2.8752286E 00	-2.2848044E 01		
	23	-9.0978336E 01	-5.7482141E 01	5.5804906E 01	-1.1163467E 01	-1.7386864E 01	6.8592541E 00	-2.7877612E 01	-2.5308747E 00	-4.6044865E 00		
	24	-3.5333799E 02	-2.6410043E 02	-4.2340360E 02	-3.0799380E 02	-9.9188573E 01	-3.7090869E 01	-2.3437060E 01	3.8955170E 01	-4.1737024E 01		
	25	-5.0816609E 02	-2.1916087E 02	-2.5696918E 01	1.8258936E 02	-8.5070596E 01	-6.4624136E 00	-1.3214157E 02	-2.5445057E 01	5.6246199E 01		
	26	-5.2854122E 02	-2.6703257E 02	-1.1905647E 02	-1.0410847E 02	-2.0775997E 02	-3.6346337E 01	-2.4820888E-01	2.1873201E 01	3.0375582E 01		
	27	2.1924191E 02	1.6769578E 02	-9.3962455E 01	1.5434441E 01	2.9829305E 01	-2.9440798E 01	5.5670869E 01	1.0219232E 01	1.4806757E 01		
	28	8.3217072E 02	5.7076083E 02	8.6381185E 02	6.4384453E 02	2.2341572E 02	7.1860922E 01	5.4208824E 01	-8.9369334E 01	3.4378036E 01		
	29	1.0551656E 03	4.7209836E 02	-3.0007237E 01	-3.7404320E 02	1.9840669E 02	3.8201146E 01	2.6579964E 02	6.1769580E 01	-1.1489754E 02		
	30	9.5508035E 02	5.4222805E 02	1.5284561E 02	1.8257187E 02	3.8760482E 02	7.4496837E 01	3.2565351E 01	-5.4025400E 01	-1.7712953E 02		
	31	-2.3941212E 02	-2.1216642E 02	7.6808854E 01	-3.8924807E 00	-1.9768821E 01	4.3666117E 01	-5.2764588E 01	-1.4977745E 01	-1.9164652E 01		
	32	-8.5902647E 02	-5.4267603E 02	-7.8446075E 02	-6.2273312E 02	-2.2914279E 02	-6.6330535E 01	-5.4883568E 01	9.3749704E 01	-7.6551256E 01		
	33	-1.0048845E 03	-4.5704524E 02	7.2309473E 01	3.5583329E 02	-1.9261133E 02	-4.7071279E 01	-2.4930245E 02	-6.8140147E 01	1.0397235E 02		
	34	-8.1495993E 02	-4.9887009E 02	-9.9593213E 01	-1.4444952E 02	-3.5020295E 02	-6.3696824E 01	-4.9252084E 01	5.8507841E 01	1.6616583E 02		
	35	9.8210634E 01	9.4557067E 01	-2.5833926E 01	-5.1982287E 00	3.7639697E 00	-2.1243635E 01	1.9218916E 01	7.1494561E 00	8.3677299E 00		
	36	3.2255334E 02	1.9329200E 02	2.6257290E 02	2.2672413E 02	8.6986891E 01	2.2980410E 01	2.0106380E 01	-3.6132643E 01	2.5753589E 01		
	37	3.5580190E 02	1.6254407E 02	-3.1449441E 01	-1.2532913E 02	6.7864702E 01	1.8490824E 01	8.7794760E 01	2.7205476E 01	-3.8719818E 01		
	38	2.6463793E 02	1.7109551E 02	2.8574842E 01	4.3819618E 01	1.2180349E 02	1.8760073E 01	2.1263323E 01	-2.3321925E 01	-5.9161358E 01		
III	39	1.9690256E-03	-1.1389377E-01	6.8733543E-03	-5.7493112E-02	6.6826336E-02	-3.7803371E-02	8.0422500E-03	9.3382100E-03	-1.9114057E-02		
	40	4.6232557E-02	-1.3689724E-02	-2.9728560E-02	-7.8466665E-02	-3.6767688E-02	1.2052531E-03	1.7549586E-02	2.4658019E-02	-1.2579991E-02		
	41	4.9233837E-01	3.2285279E-01	4.7936763E-02	3.1811227E-01	3.8513741E-01	-1.9059058E-02	-1.2126795E-01	2.0496281E-03	-1.8348798E-02		
	42	7.2663512E-01	1.6678989E-01	4.8678399E-03	4.3888898E-01	2.3175084E-01	-7.9939426E-03	-1.2012165E-01	-3.1567314E-02	-7.9430152E-02		
	43	3.0126875E-01	2.8144121E 00	-1.6785739E-02	1.3418088E-01	-2.3672784E 00	-5.2794240E-03	-1.0026930E 00	1.3270583E-02	7.9461492E-01		
	44	-1.0991832E-01	1.9545009E 00	3.3298991E-01	1.7364987E-01	4.0229872E-01	2.7346273E-03	-5.5847121E-03	-1.2751734E-01	8.6325862E-02		
	45	-7.7951696E-01	6.3800864E-01	-5.5608596E-01	-8.0546998E-01	-2.2285709E 00	1.5568347E-01	3.3923019E-01		3.1359484E-01		
	46	-9.8569555E-01	3.9941588E-01	-2.5628518E-02	-1.0479956E 00	1.2663625E-01	1.9914827E-02	4.1151205E-01		2.6927186E-01		
	47	3.5153842E-02	-8.8657514E 00	-4.0748955E-03	-1.0419376E-01	8.3650619E 00	5.2104605E-03	3.5097776E 00		-3.2033688E 00		
	48	3.3446207E-01	-8.4153931E 00	-3.0760324E-01	7.9586053E-01	-2.4949459E-01	-2.8250373E-02	-2.4518655E-01		-4.4868720E-02		
	49	-5.9598652E-01	-1.5383350E 00	7.0519177E-01	1.0433936E-01	2.4805231E 00	-1.9329893E-01	9.2560668E-03		-5.8915862E-01		
	50	-5.5677450E-01	-7.2717214E-01		1.5160523E-01	-6.5428634E-01		-1.3309883E-01		-1.4951050E-01		
	51		7.3764355E 00		3.4079674E-02	-7.6703838E 00		-2.7112635E 00		2.7871577E 00		
	52		7.1652220E 00		-6.3320016E-01							

GEOGRAPHICAL VARIATION

Harmonic		5		6		7		8	
	K \ S	9	10	11	12	13	14	15	16
I	0	1.1397500E-01	1.5571364E-01	-1.2540890E-01	2.0866415E-02	-4.2233224E-02	-7.6634055E-02	7.0799083E-02	-2.1560295E-02
	1	-1.4783157E-01	-2.7152357E-02	-7.2339322E-02	-1.0800622E-01	1.0194831E-01	-8.7145381E-03	2.2895047E-02	5.8643686E-02
	2	-3.3491126E-01	-3.5075563E-01	3.1899385E-01	8.6374820E-02	1.1290029E-01	1.9238334E-01	-2.1009562E-01	-3.3102559E-02
	3	1.3327909E-01	2.2455237E-02	8.4271655E-02	1.0799235E-01	-1.0611553E-01	1.1366427E-02	-1.6279484E-02	-6.1413435E-02
	4	2.3297510E-01	2.0305714E-01	-1.8921199E-01	-1.0973928E-01	-7.6340580E-02	-1.1772812E-01	1.4350038E-01	5.7653572E-02

I - Main latitudinal variation. Mixed latitudinal and longitudinal variation: II - First order in longitude, III - Second order in longitude

Notation: For each entry the number given by the first eight digits and sign is multiplied by the power of ten defined by the last two digits and sign.

PREDICTED COEFFICIENTS D_{SK} DEFINING THE FUNCTION $\Gamma(\lambda,\theta,t)$ FOR MONTHLY MEDIAN f_o F2 (Mc/s)

AUGUST 1964

TABLE 2

TIME VARIATION

GEOGRAPHICAL VARIATION

Harmonic		0	1		2		3	
	K \ S	0	1	2	3	4	5	6
I	0	3.0151307E 00	-1.2534418E-01	-2.5861804E-01	-2.7398260E-02	-1.1125978E-01	2.1289236E-02	-3.7625548E-03
	1	-5.4938437E-01	-1.3903764E-01	-3.3447554E-01	1.3124341E-01	-6.1930190E-01	1.0158272E-01	7.3276213E-02
	2	1.8893099E 00	9.3596407E-01	2.6282034E 00	1.2835444E-01	-4.1410339E-01	-5.2034497E-01	-2.7849781E-01
	3	2.1246885E 00	4.8835698E-01	1.1549680E 00	-9.4217874E-01	3.0330604E 00	-3.8916093E-01	-3.3163015E-01
	4	-5.8396695E 00	-2.3112462E 00	-6.9112032E 00	-9.0958877E-01	2.4804165E 00	1.9557813E 00	6.2163628E-01
	5	-3.4186546E 00	-4.1568241E-01	-1.8768544E 00	1.6683770E 00	-4.6789086E 00	5.6368920E-01	6.7909600E-01
	6	6.4869422E 00	2.5535478E 00	7.4565811E 00	1.6030899E 00	-3.7006882E 00	-2.6753557E 00	-3.6447056E-01
	7	1.8079000E 00	9.8083251E-02	9.3134985E-01	-8.5690526E-01	2.2515048E 00	-2.7324293E-01	-4.0371004E-01
	8	-2.4888639E 00	-1.0413850E 00	-2.9601714E 00	-7.8764449E-01	1.7333184E 00	1.2306927E 00	1.7478493E-02
II	9	1.4980735E-02	7.0362478E-03	4.3335888E-02	-3.4948801E-02	4.1802807E-03	1.6201783E-02	-6.2226968E-03
	10	9.6998891E-02	4.7517506E-02	7.2484629E-02	-5.1623387E-02	8.7328564E-02	-9.5298532E-03	5.2352490E-03
	11	1.5999440E-01	-6.1213404E-02	1.5960182E-01	1.0898106E-02	2.0197557E-02	-4.5319620E-02	-3.8681519E-02
	12	-5.2910379E-01	-3.2517987E-01	-9.3485886E-01	-1.1587276E-02	-8.4725314E-02	1.5375195E-01	1.9768486E-01
	13	-1.3037487E-01	-2.6616982E-01	-8.6677357E-01	4.7179306E-01	-3.2429731E-01	-1.3306553E-01	-1.5297586E-01
	14	-1.1304664E 00	-8.1989986E-01	-6.9378189E-02	6.8481017E-01	-1.6240093E 00	8.2509475E-02	7.5102203E-02
	15	-1.3467724E 00	4.5027885E-01	-6.0028578E-01	-8.2608835E-02	2.7088207E-01	8.5710984E-02	2.5233705E-01
	16	3.7755155E 00	1.9220768E 00	5.6247949E 00	-2.4962996E-01	3.4083215E-01	-1.2362399E 00	-1.1141610E 00
	17	7.8490378E-01	1.7863714E 00	3.4446420E 00	-2.2104112E 00	1.6102918E 00	4.6739779E-01	9.4893302E-01
	18	3.0456927E 00	3.7496807E 00	-1.7294401E 00	-2.8798410E 00	7.1282127E 00	-2.3972695E-01	-1.0262097E 00
	19	2.9234525E 00	-1.2573850E 00	7.2873259E-01	2.1810407E-02	-1.0511321E 00	3.2451348E-01	-4.5369408E-01
	20	-6.5689470E 00	-3.4655872E 00	-9.1431919E 00	8.9126726E-01	-4.6958563E-01	2.4978641E 00	1.8261140E 00
	21	-5.6703155E-01	-3.7971431E 00	-4.5463033E 00	3.5098505E 00	-2.7580267E 00	-3.9118610E-01	-1.3571662E 00
	22	-2.5509247E 00	-6.4032912E 00	4.5211514E 00	4.5840607E 00	-1.0739256E 01	2.5624588E-01	2.1618701E 00
	23	-1.8273603E 00	8.4326869E-01	-1.1985028E-01	5.9959105E-02	9.1633779E-01	-3.6956308E-01	2.7861410E-01
	24	3.3807658E 00	2.0346687E 00	4.7756156E 00	-6.9324502E-01	2.2686482E-01	-1.4799971E 00	-9.4806100E-01
	25	1.3122960E-01	2.4820209E 00	2.2046485E 00	-1.8314800E 00	1.5048401E 00	-2.9873543E-02	4.6496900E-01
	26	3.2645362E-01	3.5599796E 00	-2.8893461E 00	-2.3563876E 00	5.2814576E 00	-7.3102164E-02	-1.2583549E 00
III	27	-2.8939878E-03	-1.8112767E-02	1.5219374E-02	-2.1698030E-02	5.1434256E-03	-4.4176655E-04	-8.8829310E-03
	28	-2.9598730E-03	-9.8274168E-03	1.7957323E-02	-1.2955273E-02	1.2460016E-02	3.8315205E-04	2.4494043E-03
	29	-1.4204415E-01	-1.0820169E-01	-1.2755371E-02	1.0709111E-02			-3.1042417E-02
	30	1.1028799E-01	-5.2673899E-02	-2.8002308E-02	4.2806908E-02			1.4001915E-02
	31	-3.0912975E-02	4.6182581E-02	3.3841642E-02	1.3244651E-01			1.6846748E-02
	32	-2.3258054E-02	1.2751131E-01	-1.6596618E-01	5.0802625E-02			-1.3349258E-02
	33	2.9199528E-01	2.1922485E-01	4.9485977E-03	-6.0923414E-02			1.0399680E-01
	34	-3.1767082E-01	2.1571910E-01	1.0500611E-02	-3.3979361E-03			
	35			2.5833717E-02	-2.4289807E-01			
	36							

GEOGRAPHICAL VARIATION

Harmonic		4		5		6	
	K \ S	7	8	9	10	11	12
I	0	3.5074923E-02	2.0060577E-03	4.3223167E-03	2.8975351E-02	-1.1590486E-02	3.8048451E-03
	1	3.7273195E-03	3.4718229E-02	-3.5069415E-02	-1.5862664E-02	3.1392451E-03	-2.5882834E-02
	2	-4.6400184E-02	-5.0329212E-03	6.6118475E-04	-3.5063443E-02	1.5700815E-02	-2.7328175E-03
	3	-1.1760941E-03	-2.6267028E-02	2.9777813E-02	1.1796475E-02	1.0641623E-03	2.0582519E-02

I - Main latitudinal variation. Mixed latitudinal and longitudinal variation: II - First order in longitude, III - Second order in longitude.

Notation: For each entry the number given by the first eight digits and sign is multiplied by the power of ten defined by the last two digits and sign.

PREDICTED COEFFICIENTS D_{SK} DEFINING THE FUNCTION $\Gamma(\lambda,\theta,t)$ FOR MONTHLY MEDIAN M(3000)F2

AUGUST 1964

AUGUST 1964 UT=00

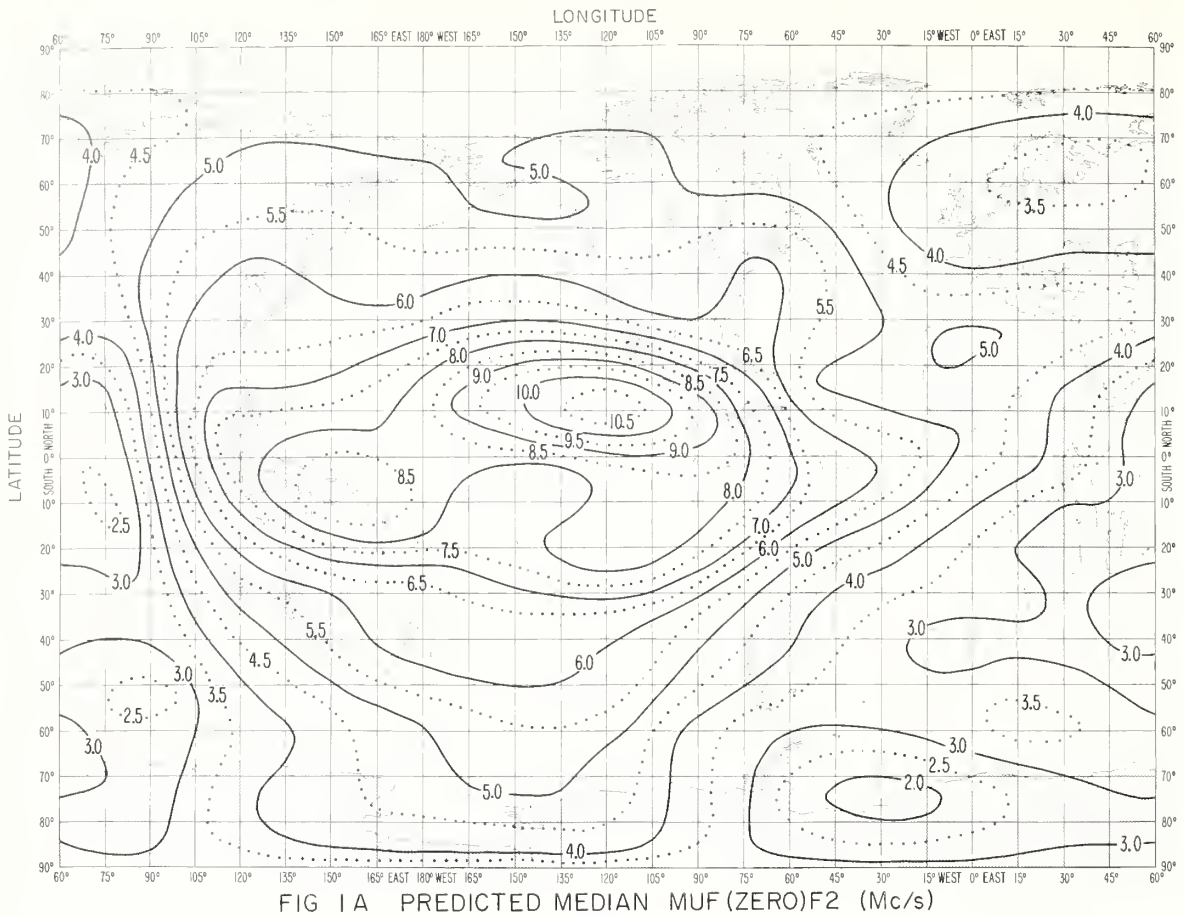


FIG 1A PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

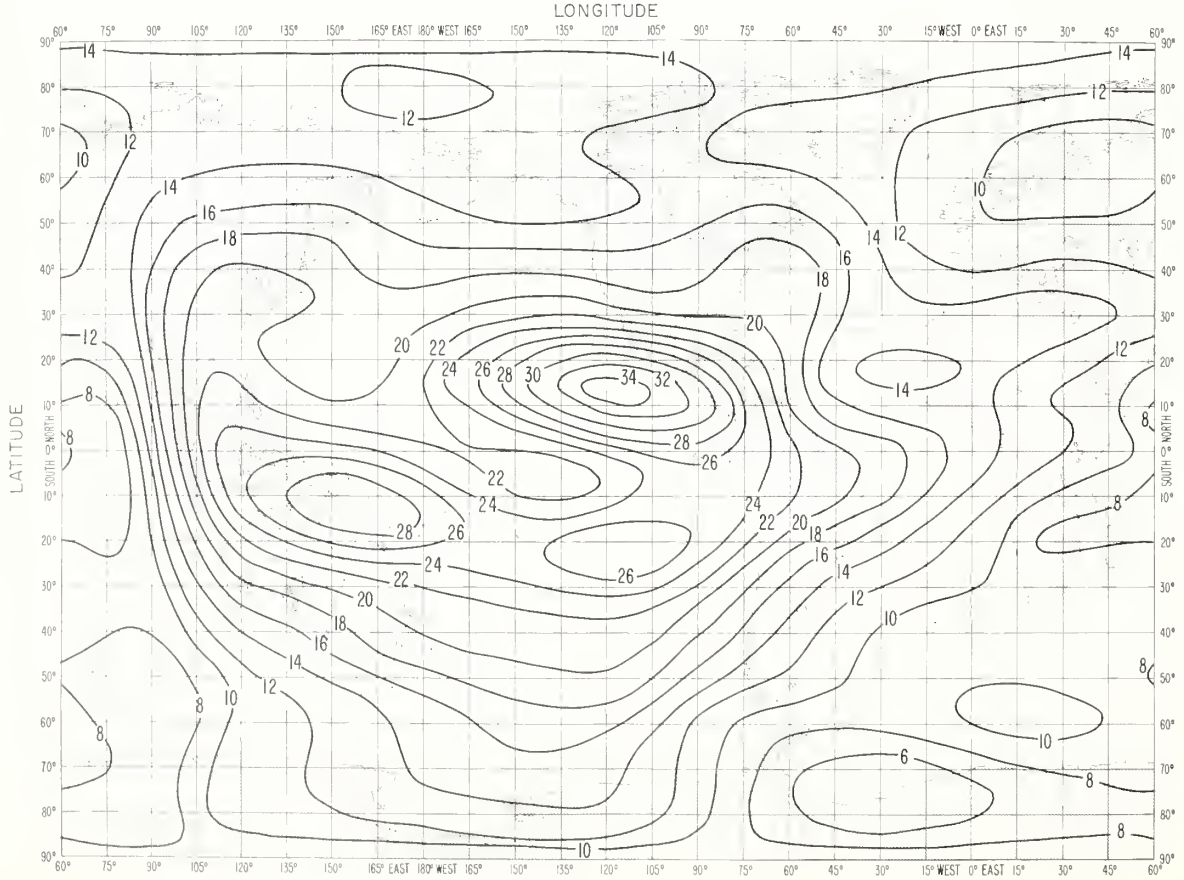


FIG. 1B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

AUGUST 1964 UT=02

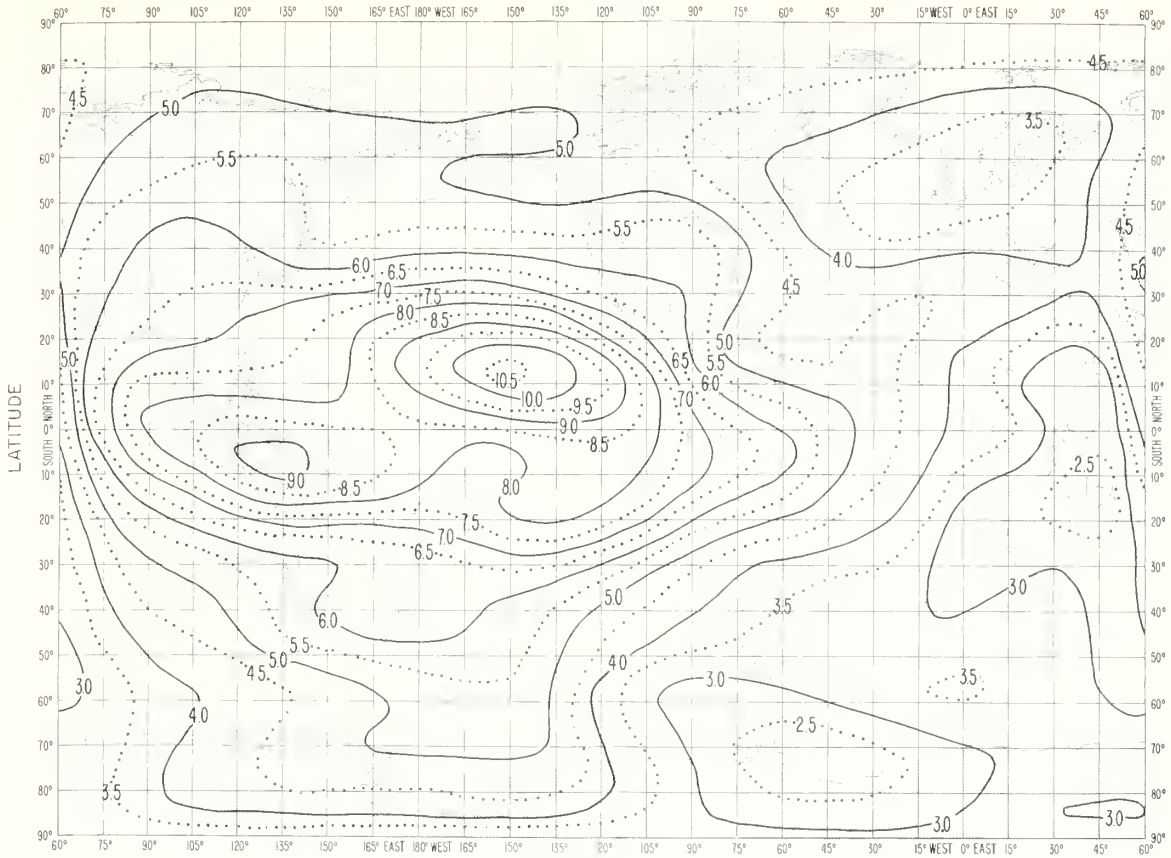


FIG. 2A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

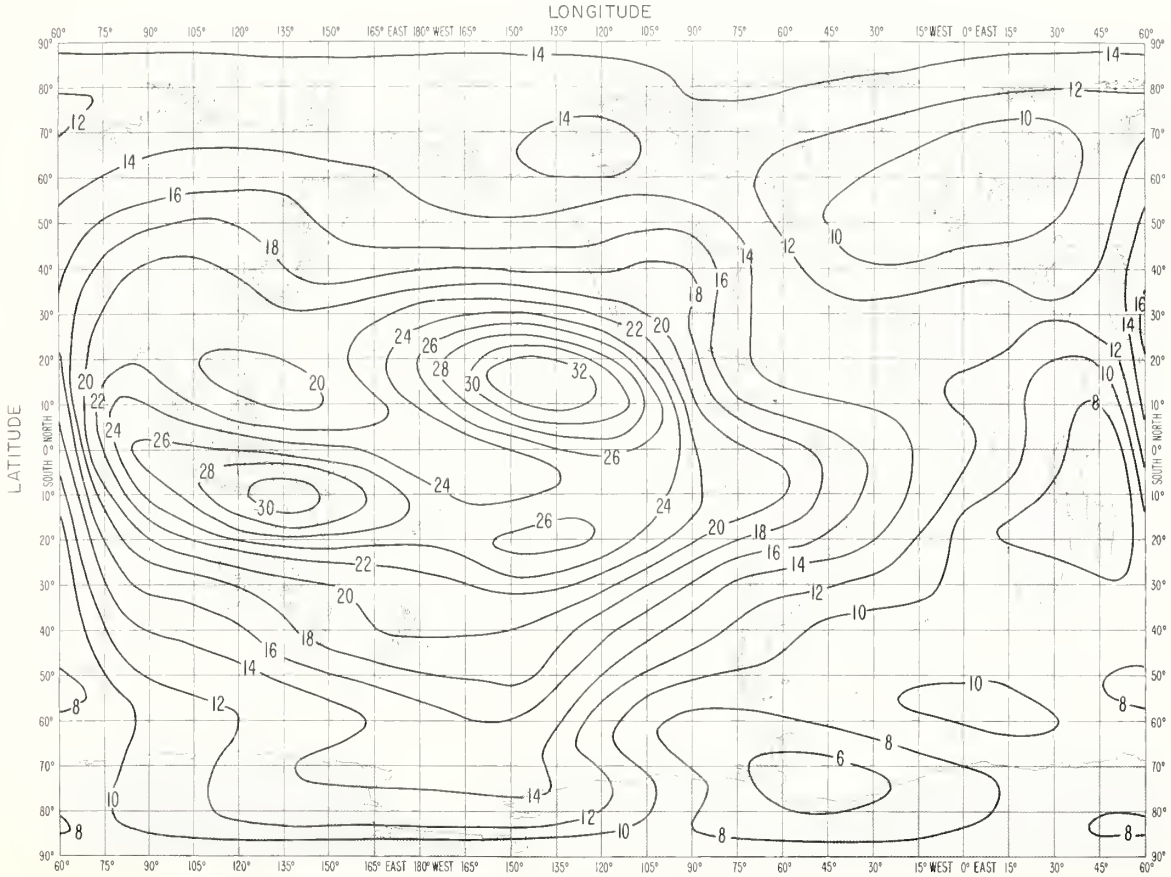


FIG. 2B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

AUGUST 1964 UT=04

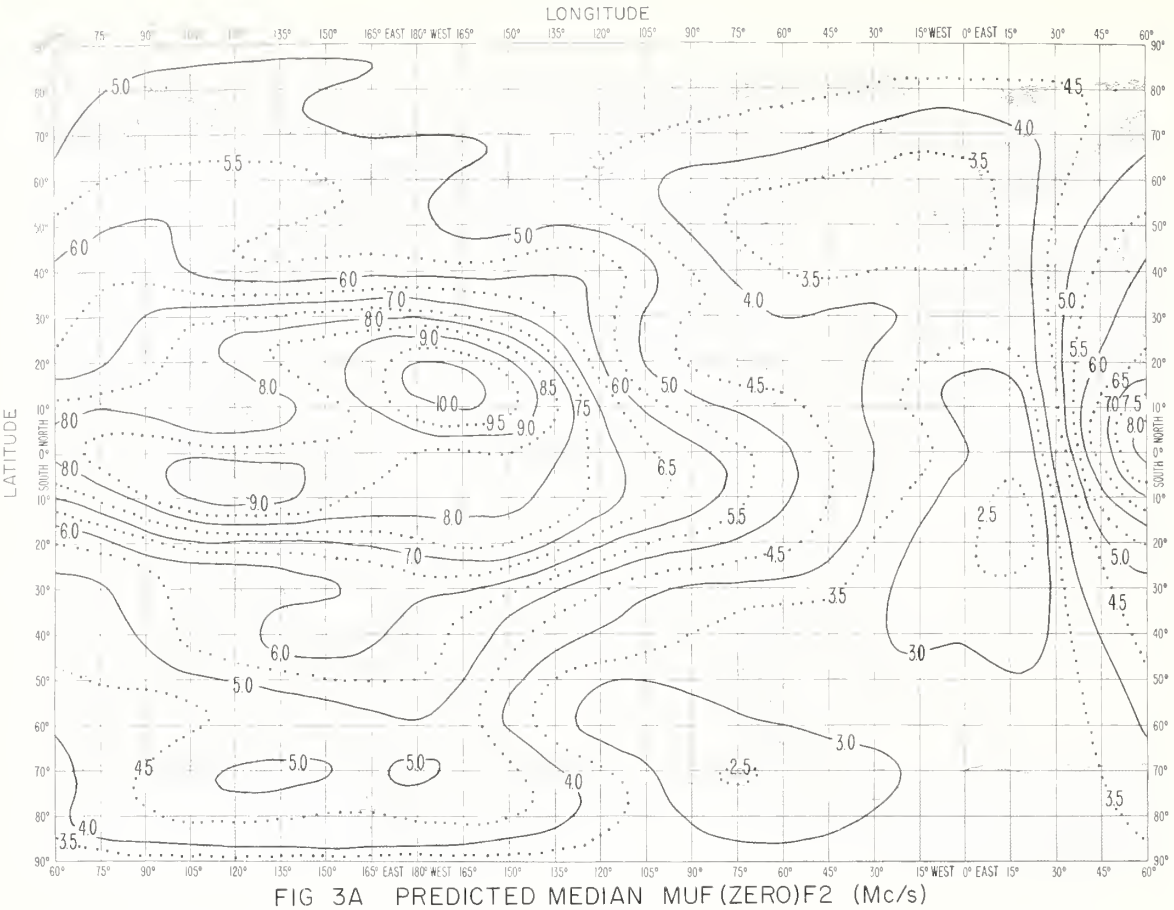


FIG 3A PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

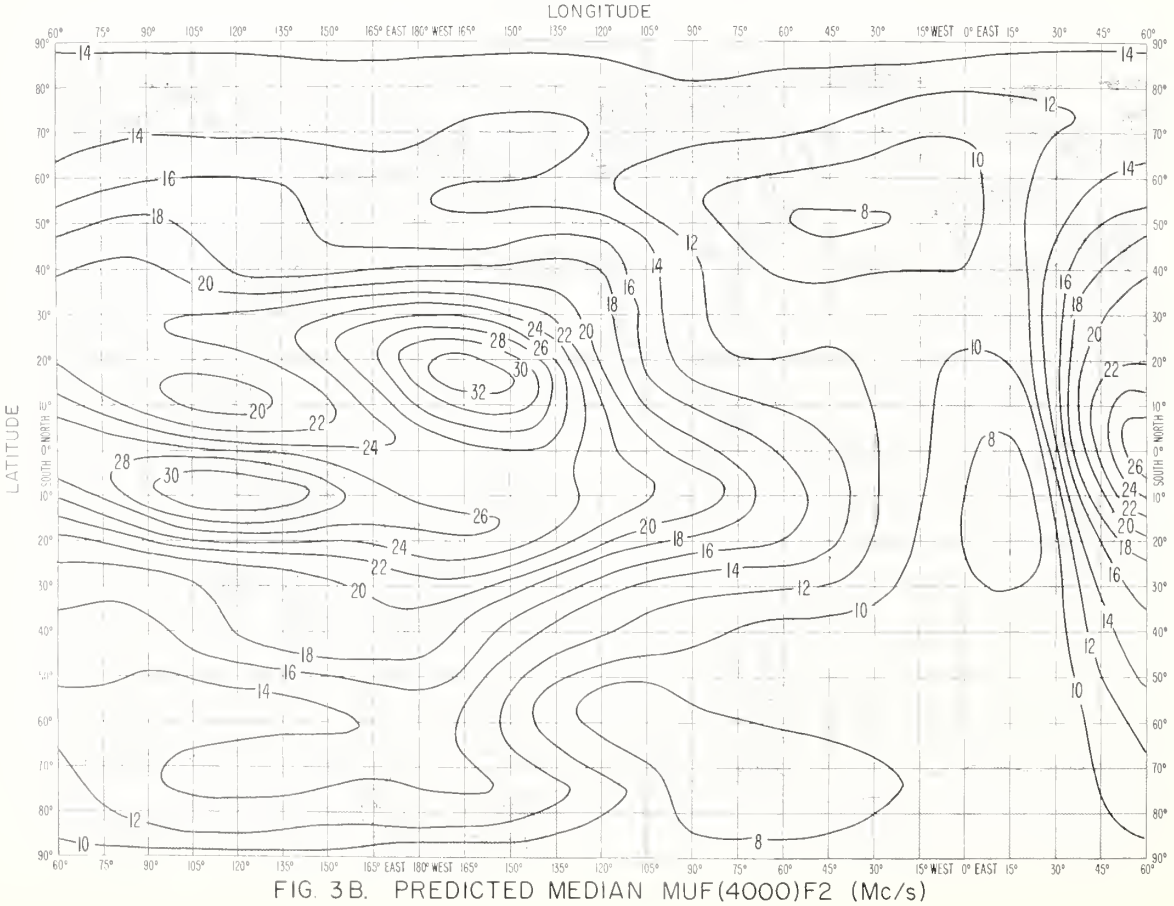


FIG. 3B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

AUGUST 1964 UT=06

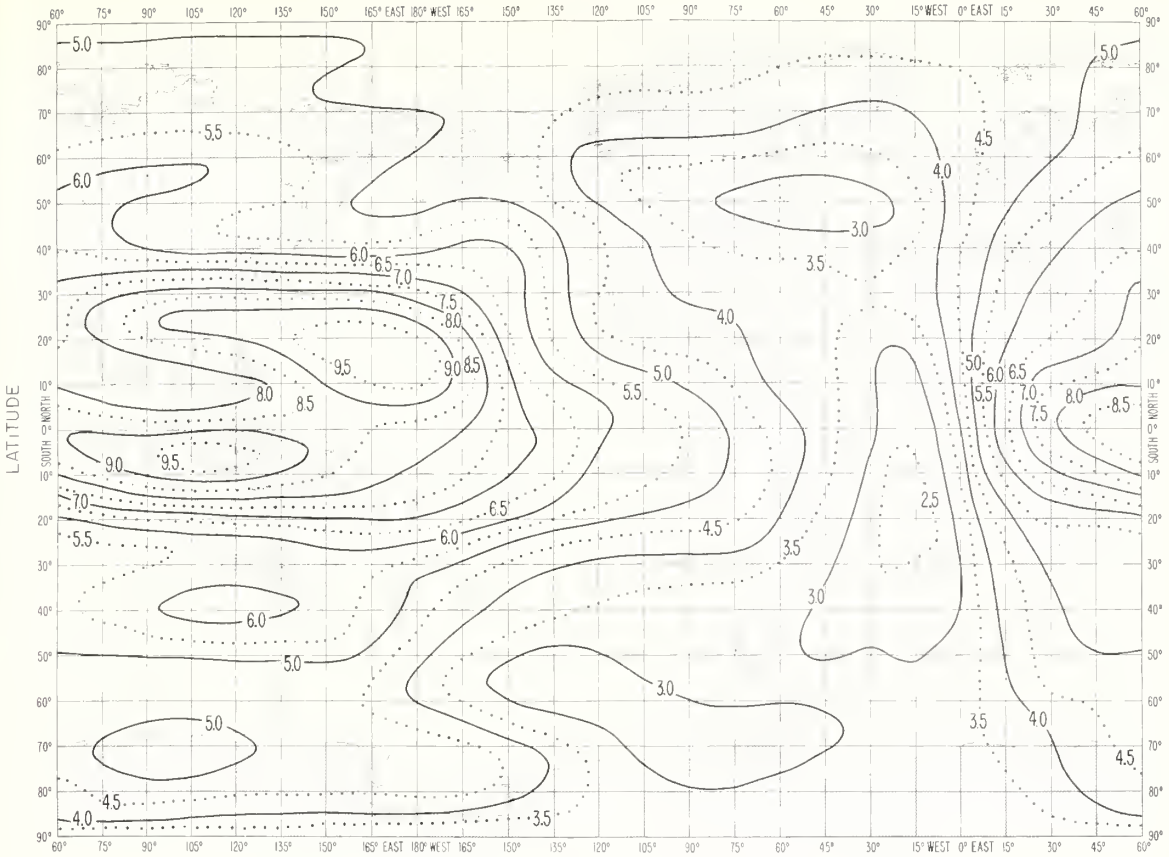


FIG 4A PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

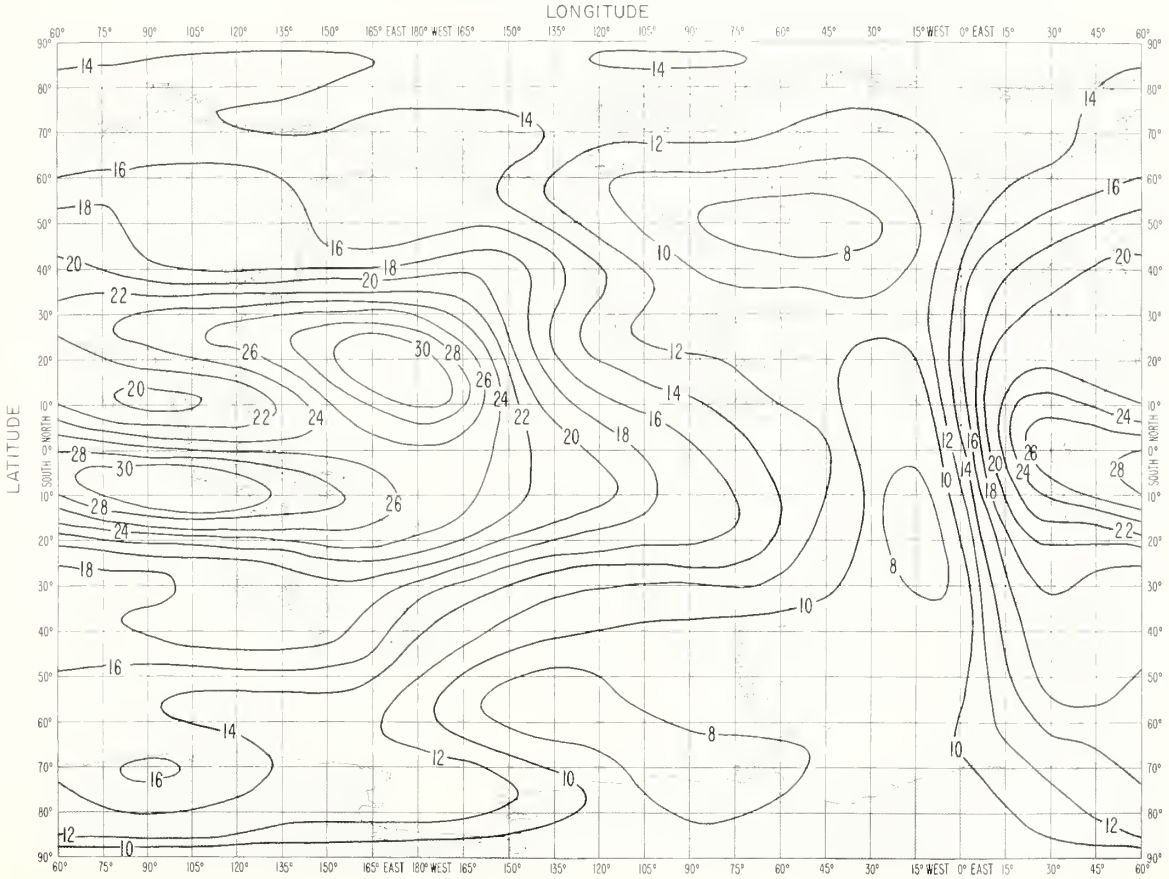


FIG. 4B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

AUGUST 1964 UT=08

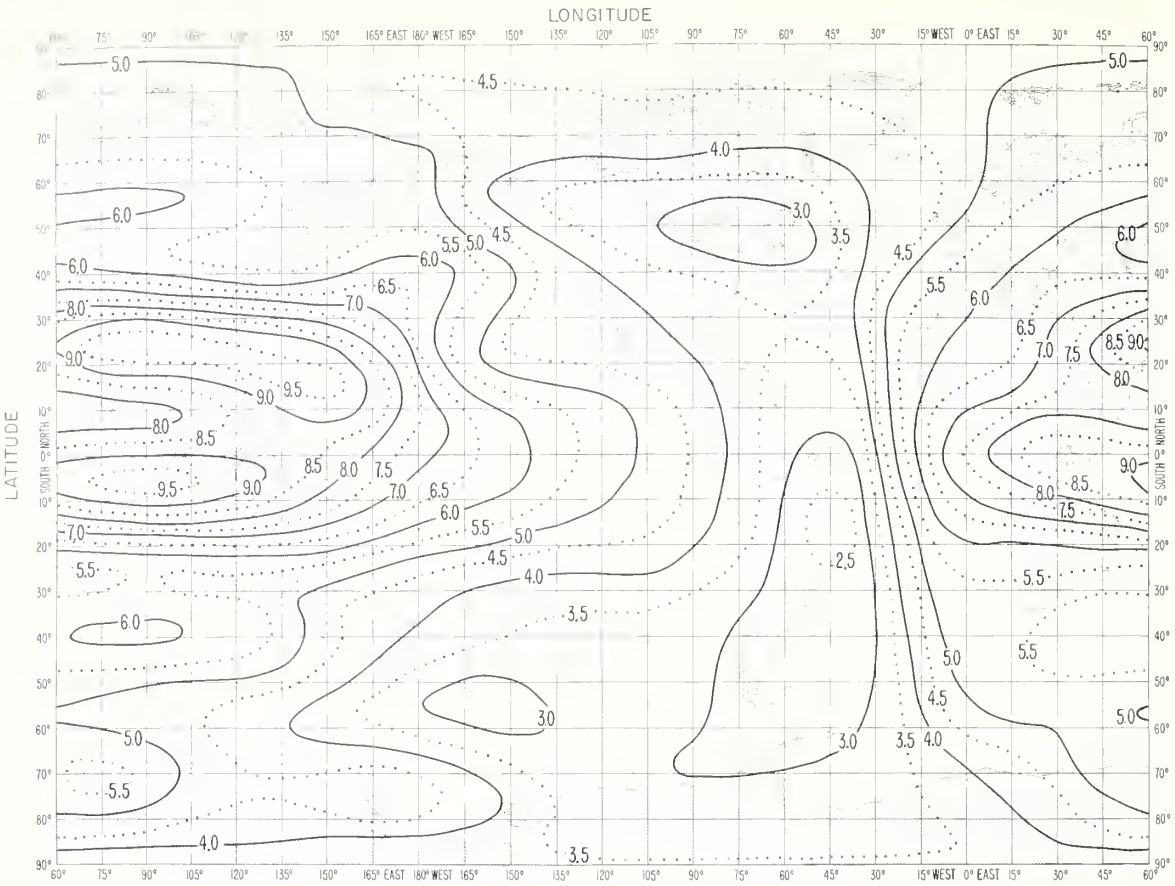


FIG 5A PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

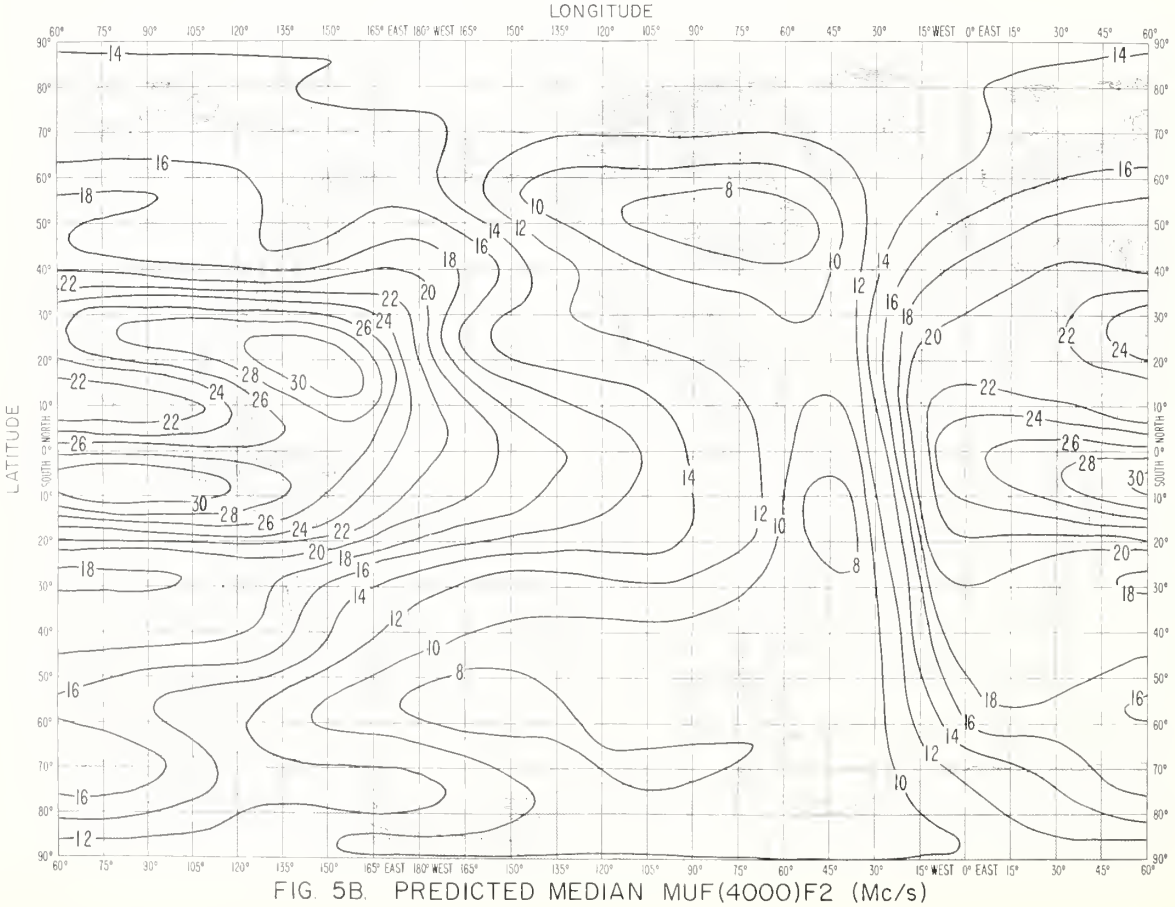


FIG. 5B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

AUGUST 1964 UT=10

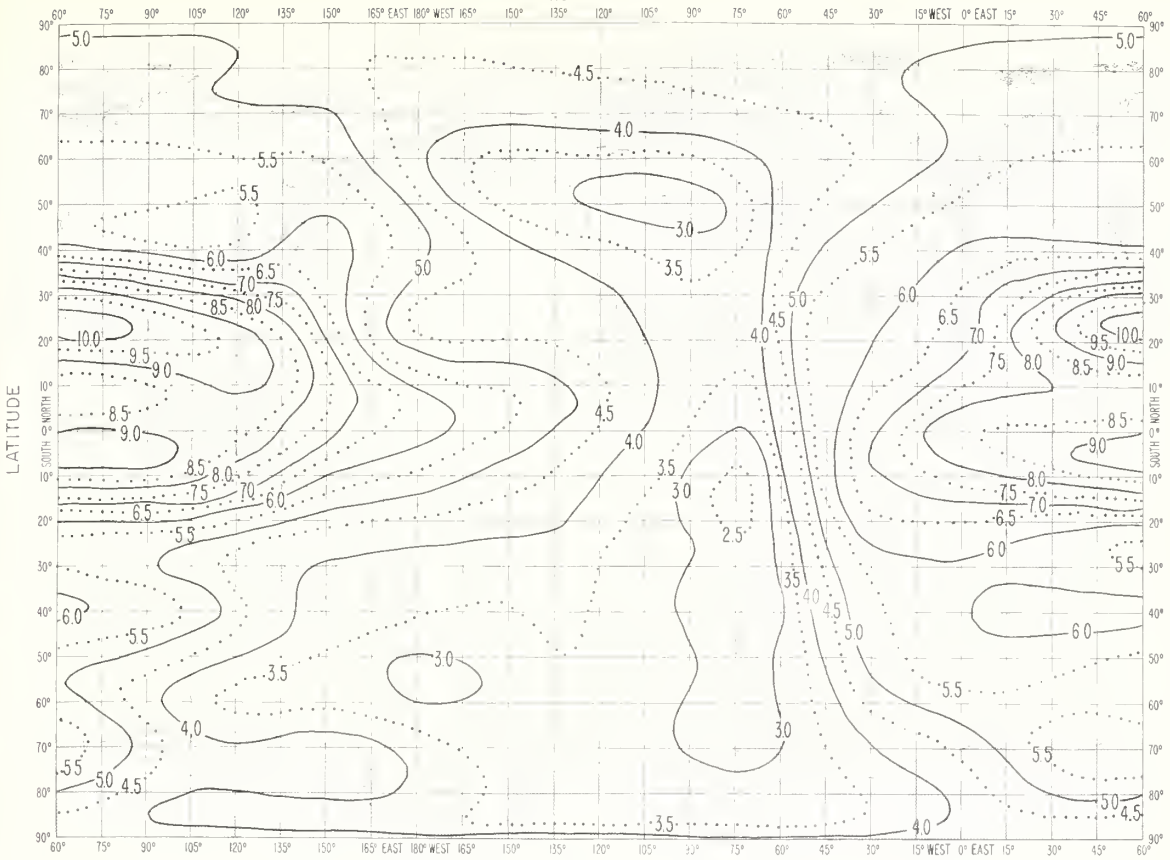


FIG 6A PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

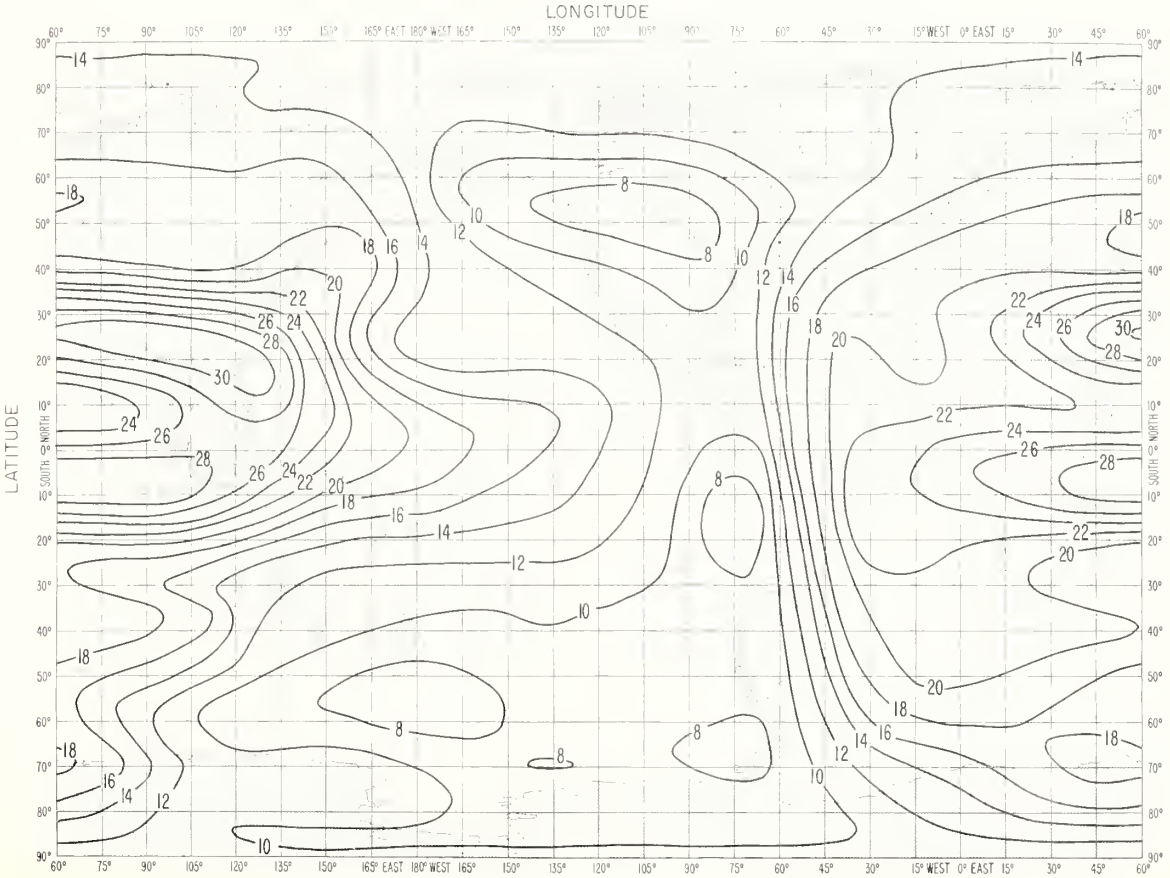


FIG. 6B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

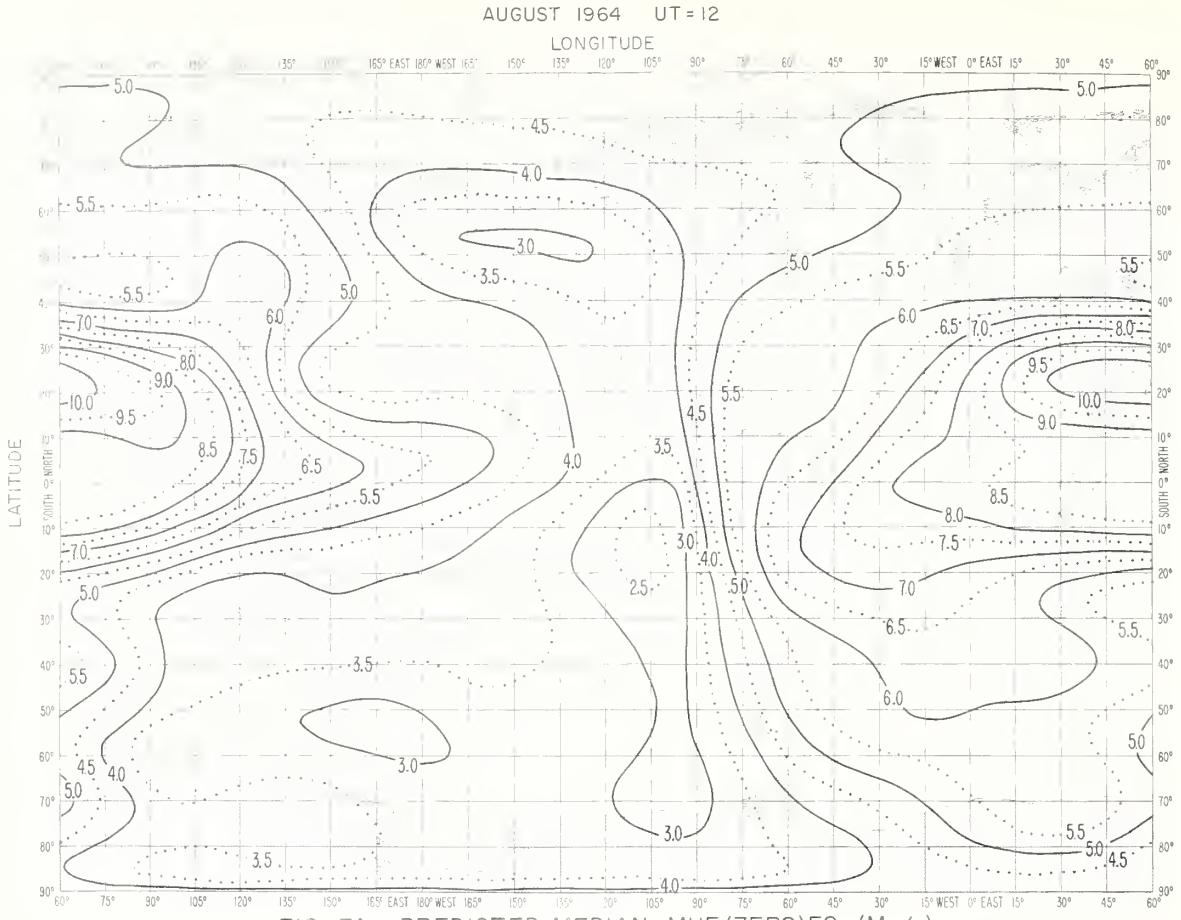


FIG. 7A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

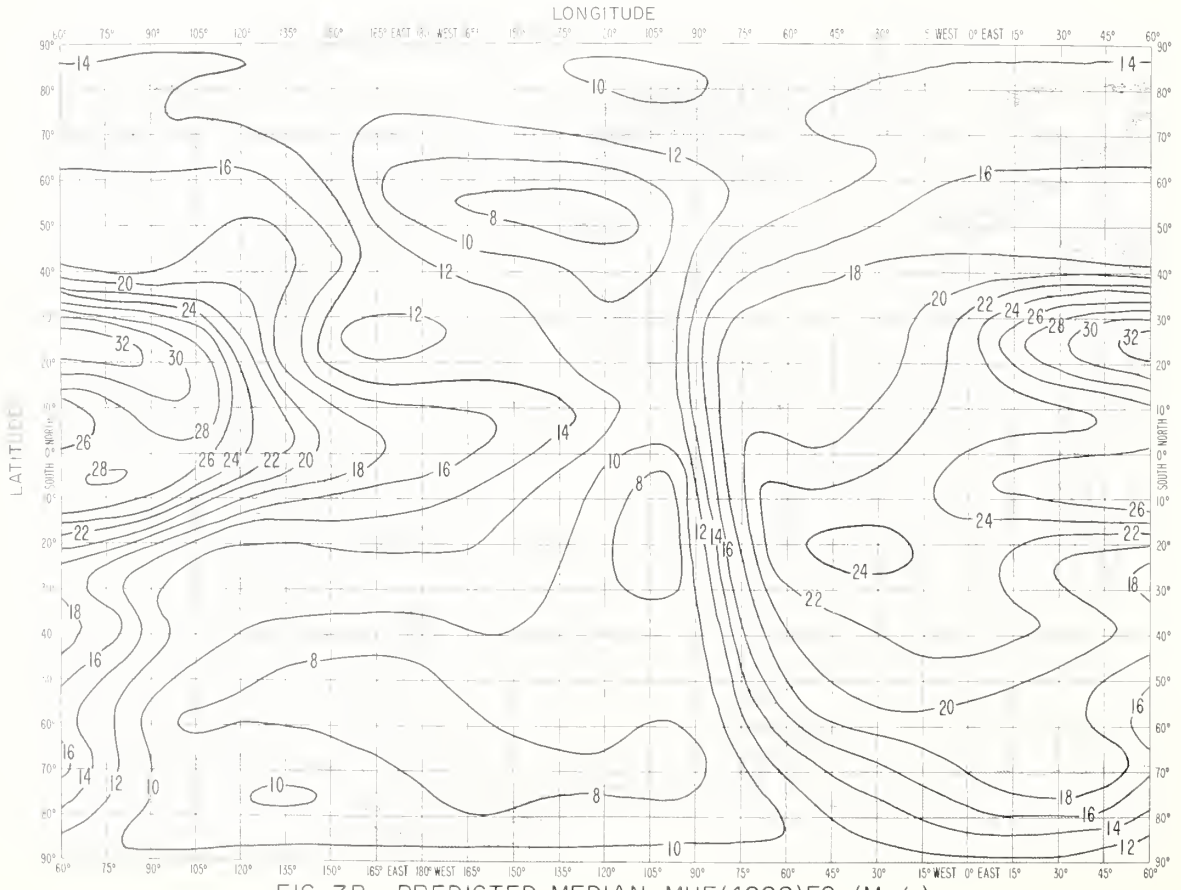


FIG. 7B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

AUGUST 1964 UT = 14

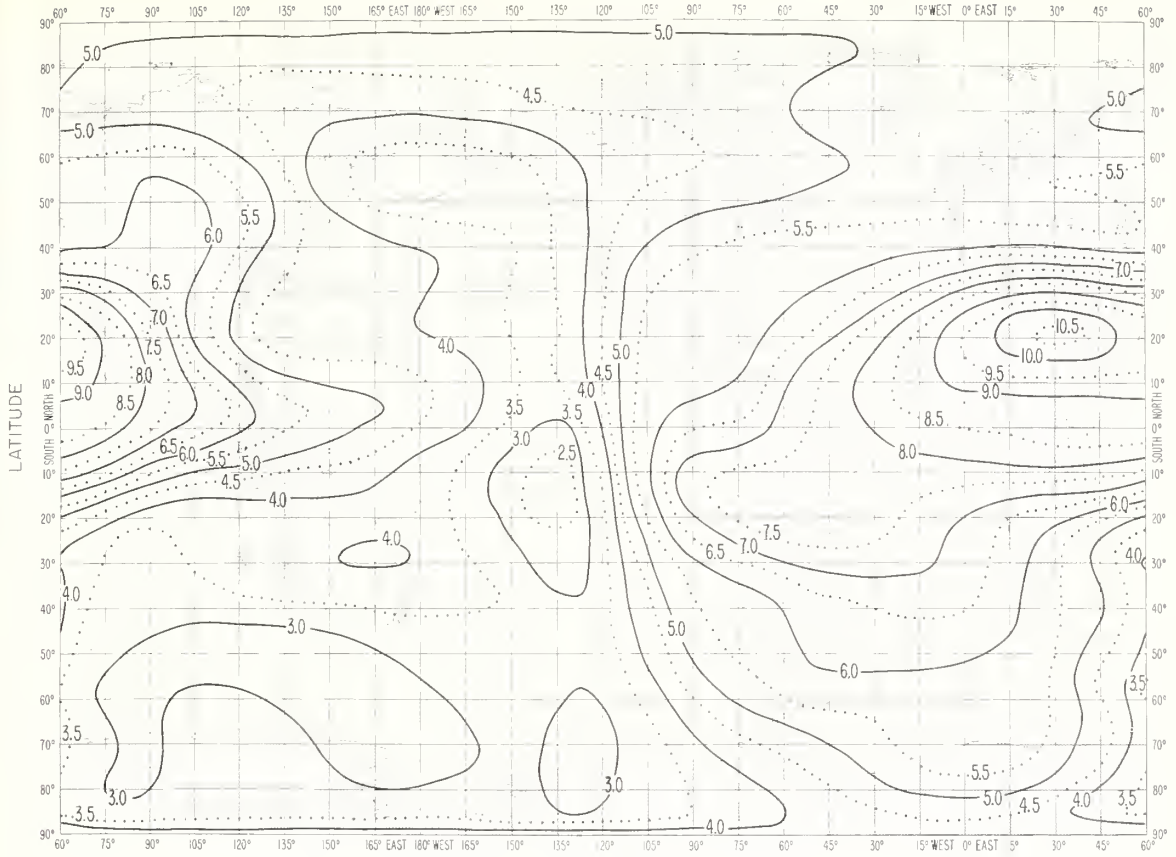


FIG. 8A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

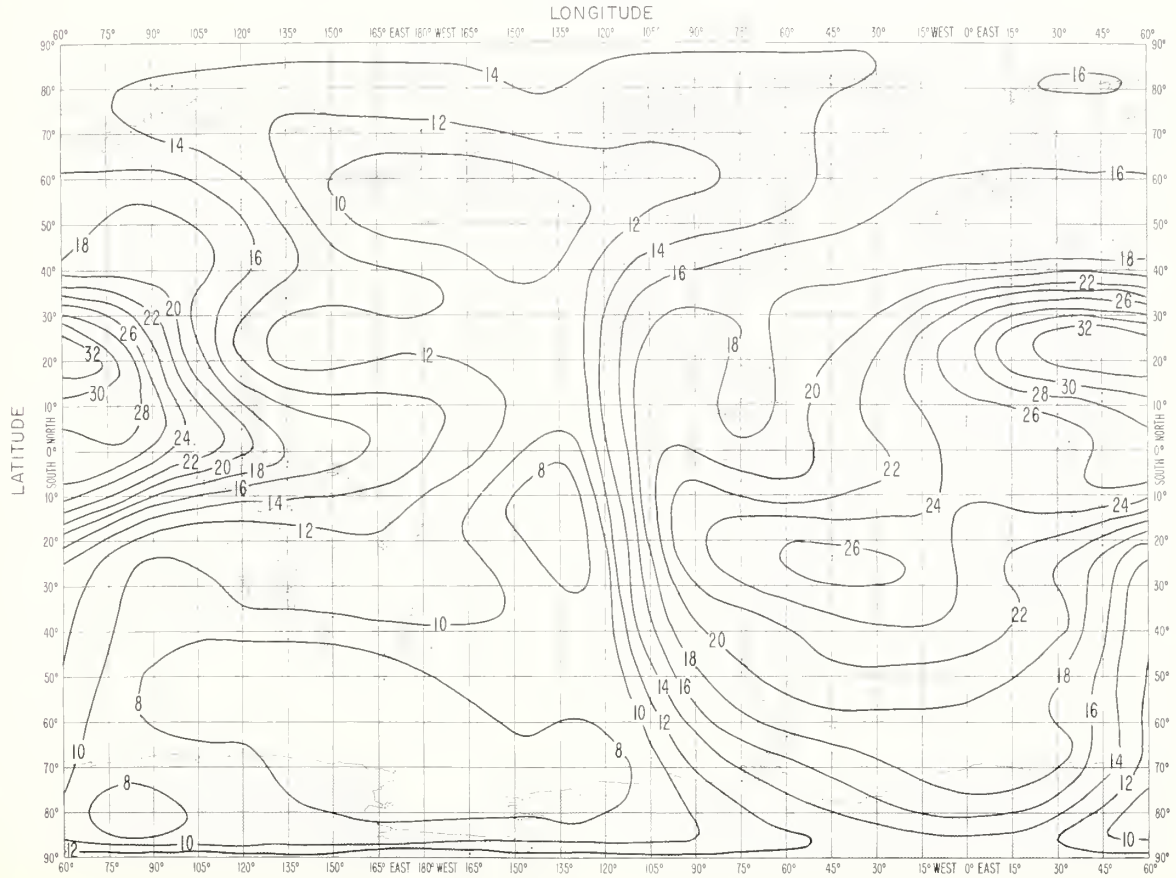


FIG. 8B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

AUGUST 1964 UT= 16

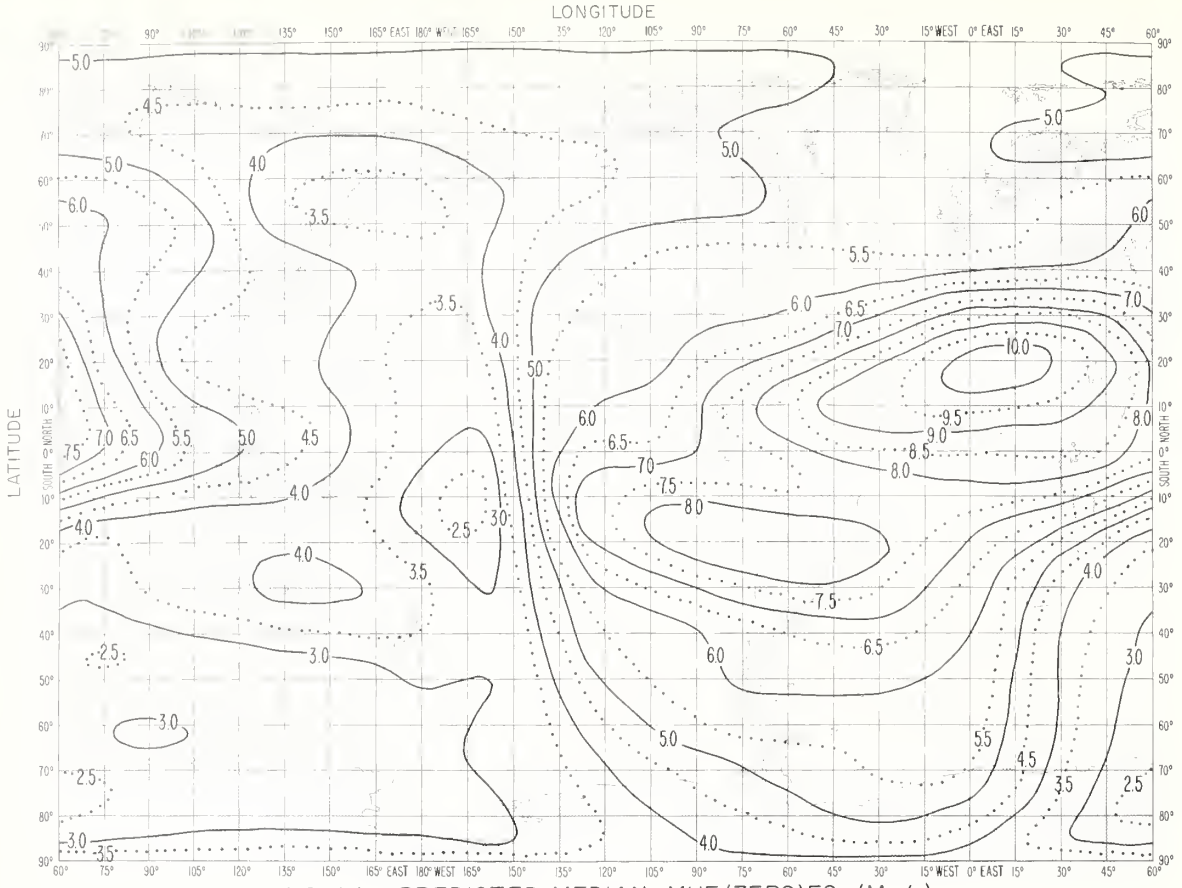


FIG. 9A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

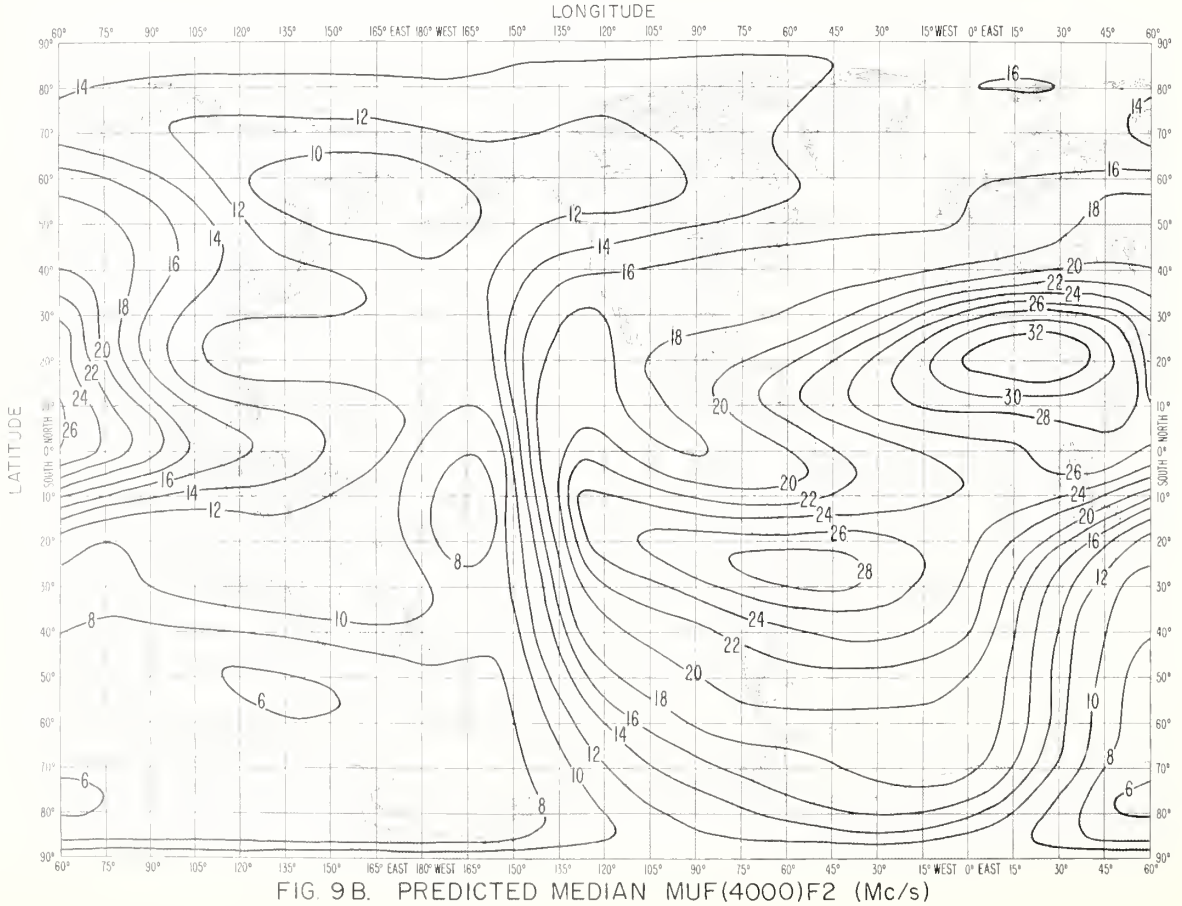


FIG. 9B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

AUGUST 1964 UT = 18

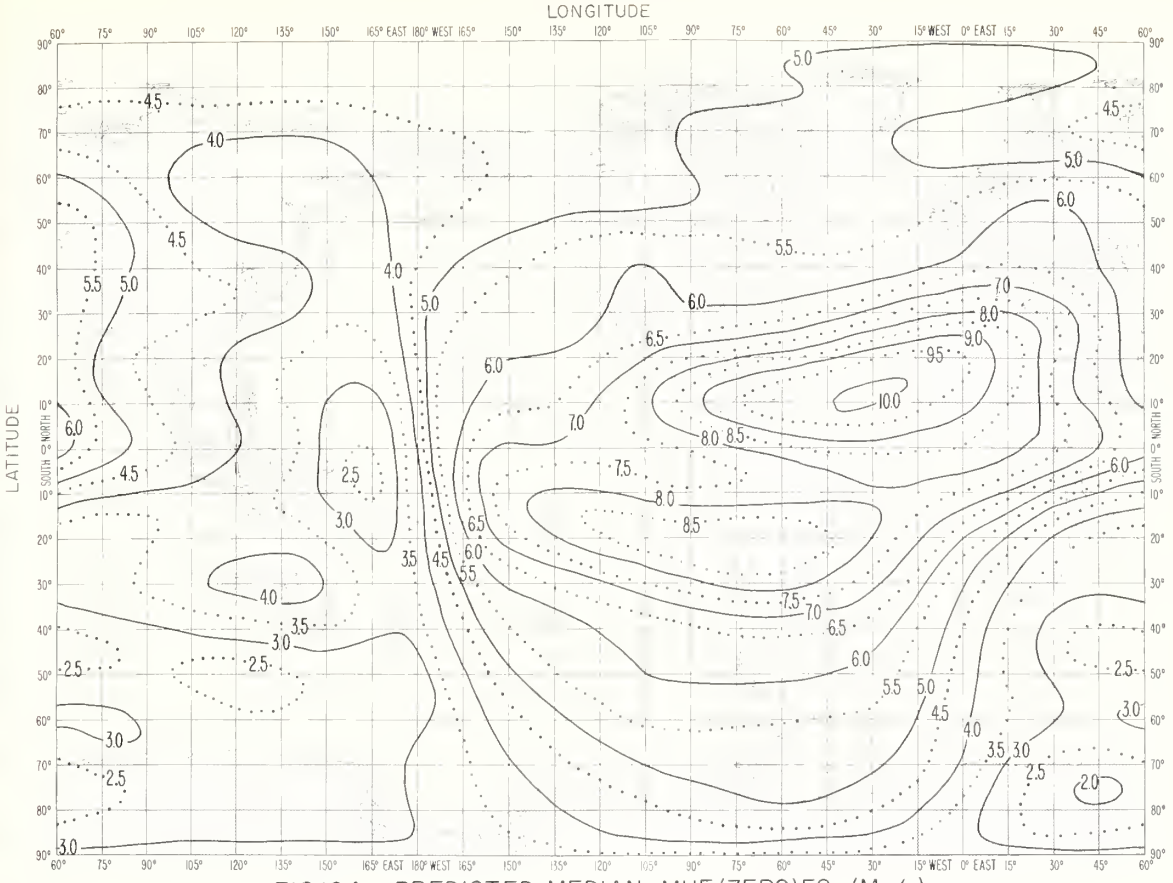


FIG 10A PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

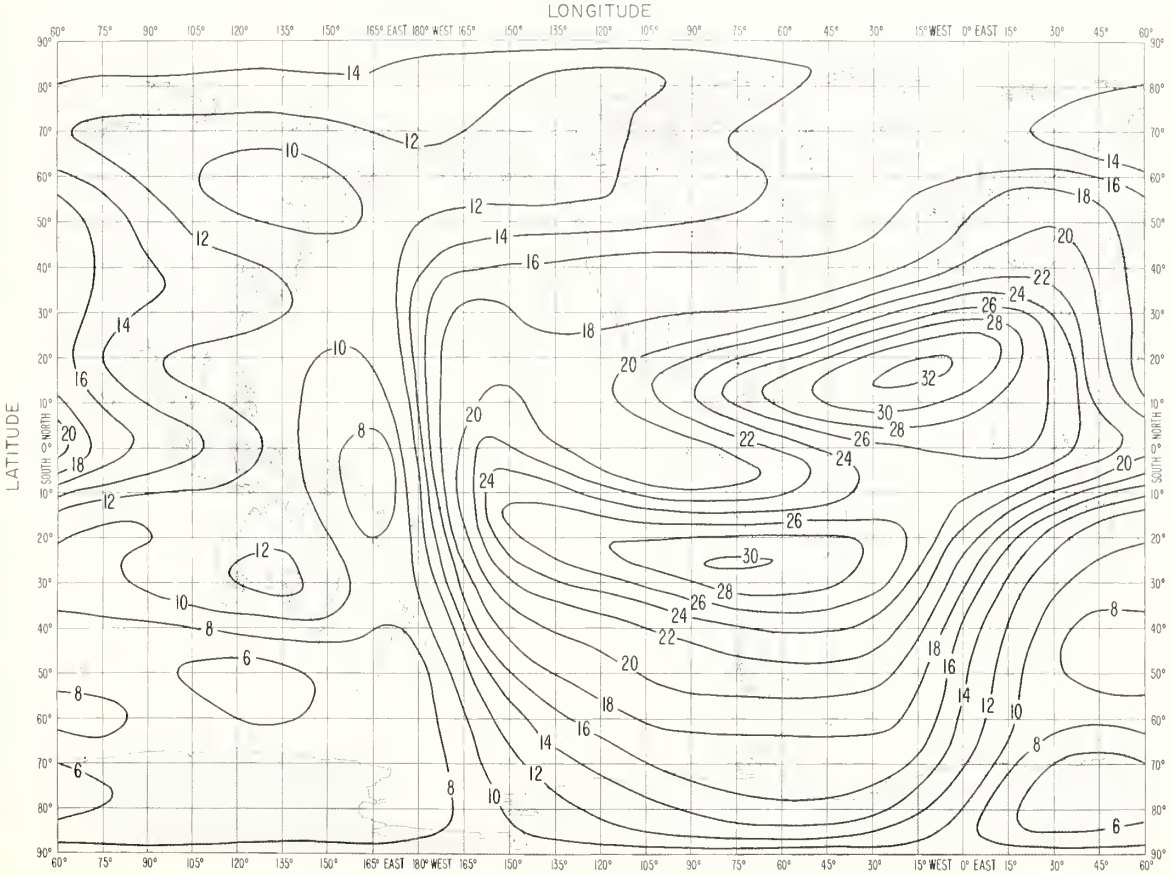


FIG 10B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

AUGUST 1964 UT=20

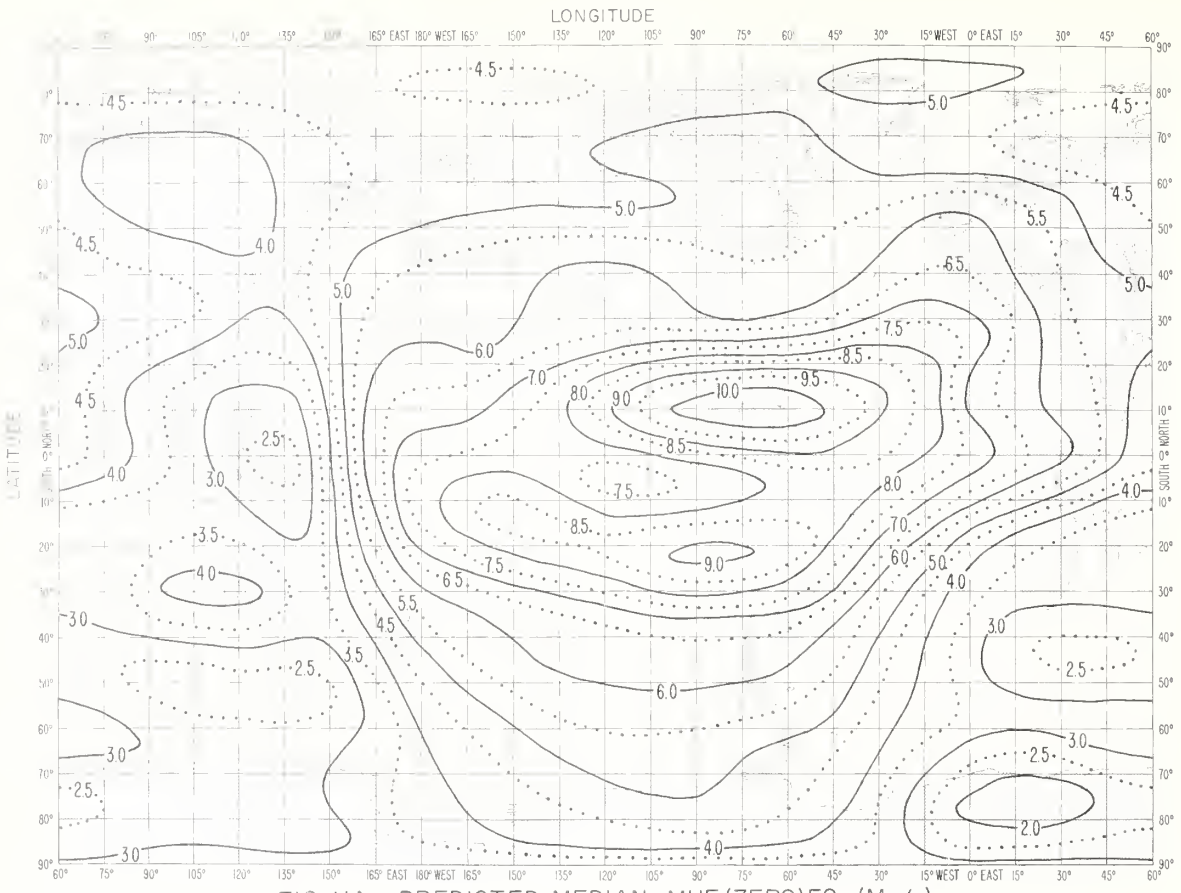


FIG 11A PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

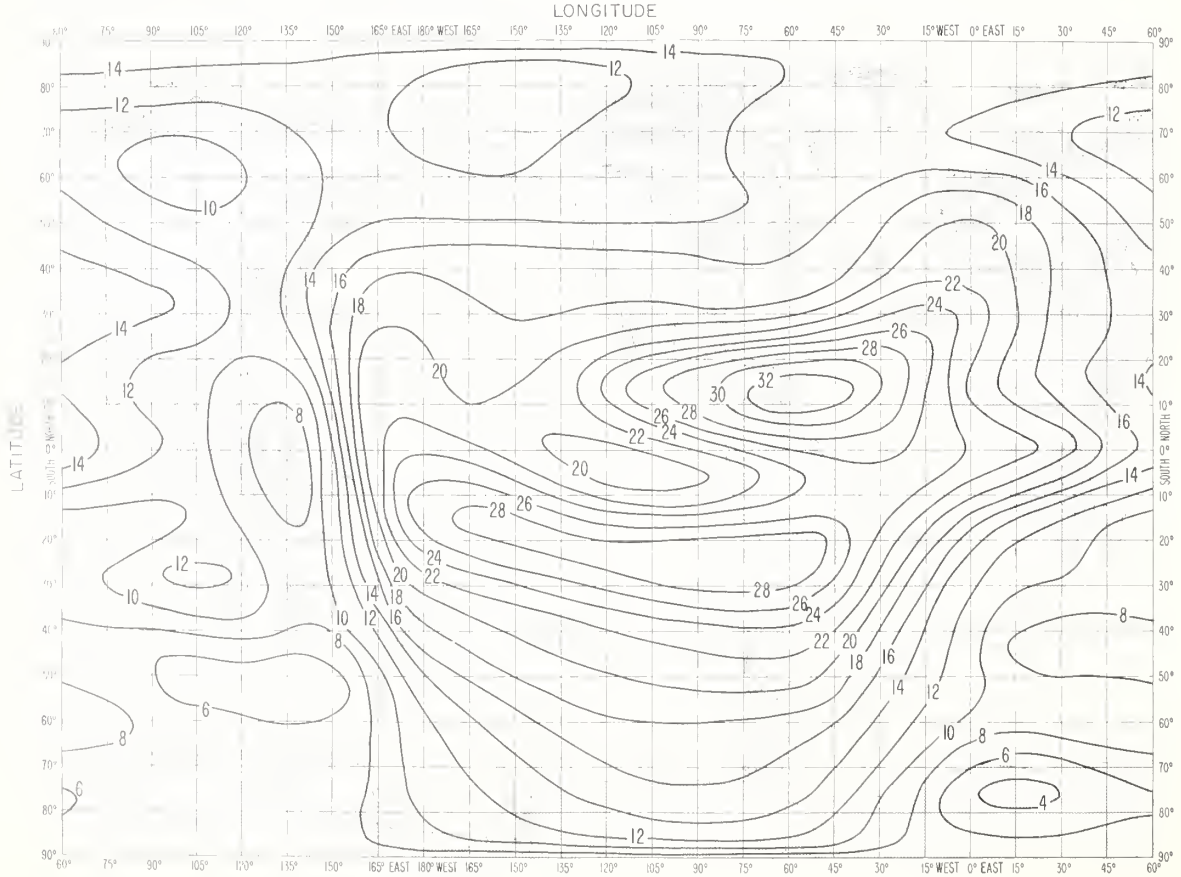


FIG 11B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

AUGUST 1964 UT=22

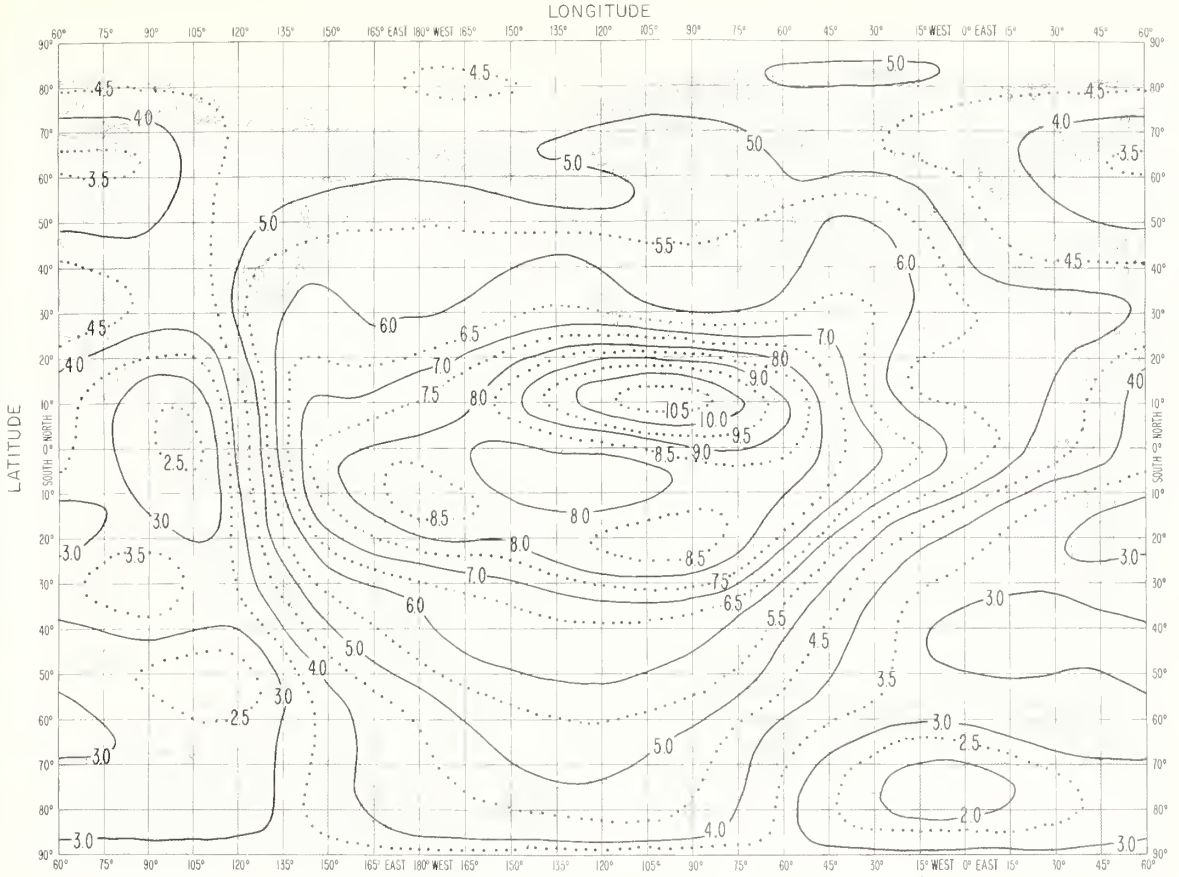


FIG 12A PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

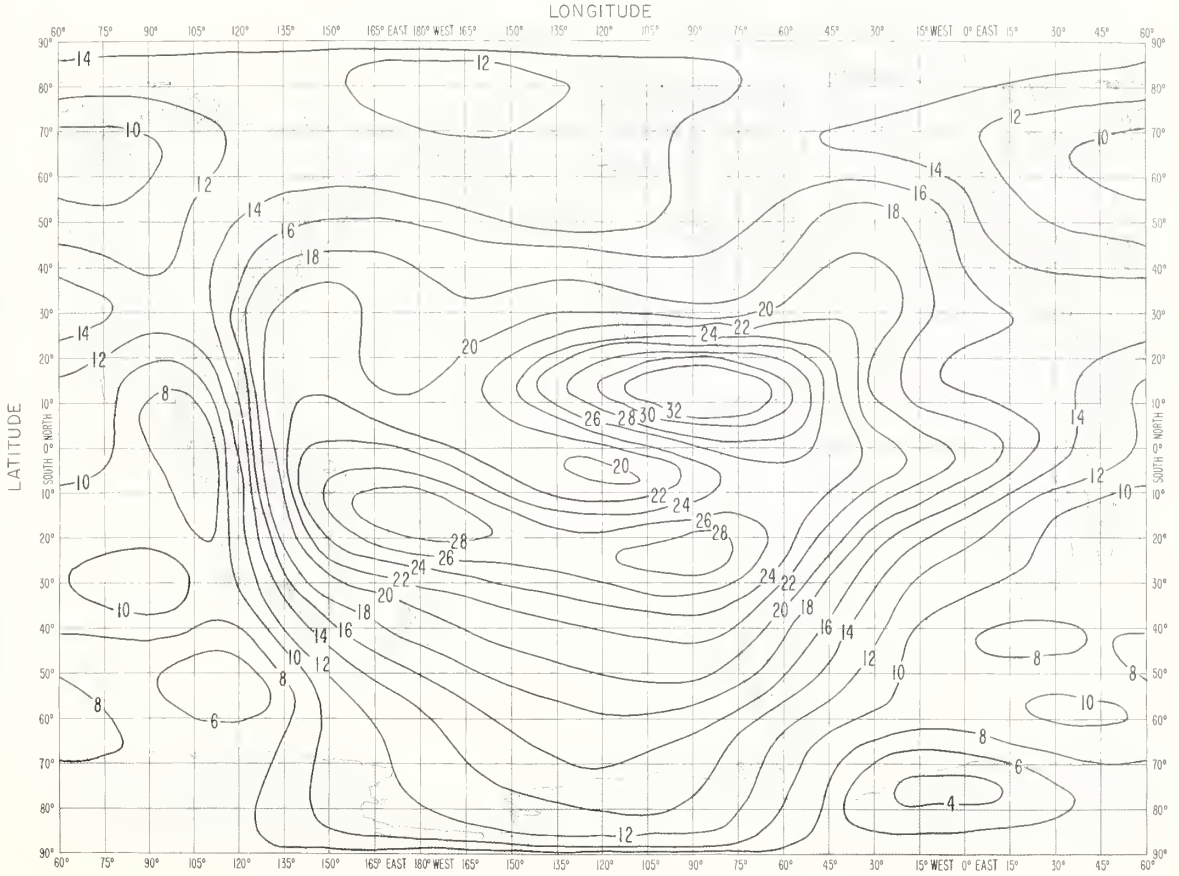


FIG. 12B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

NORTH POLAR AREA
AUGUST 1964 UT=00

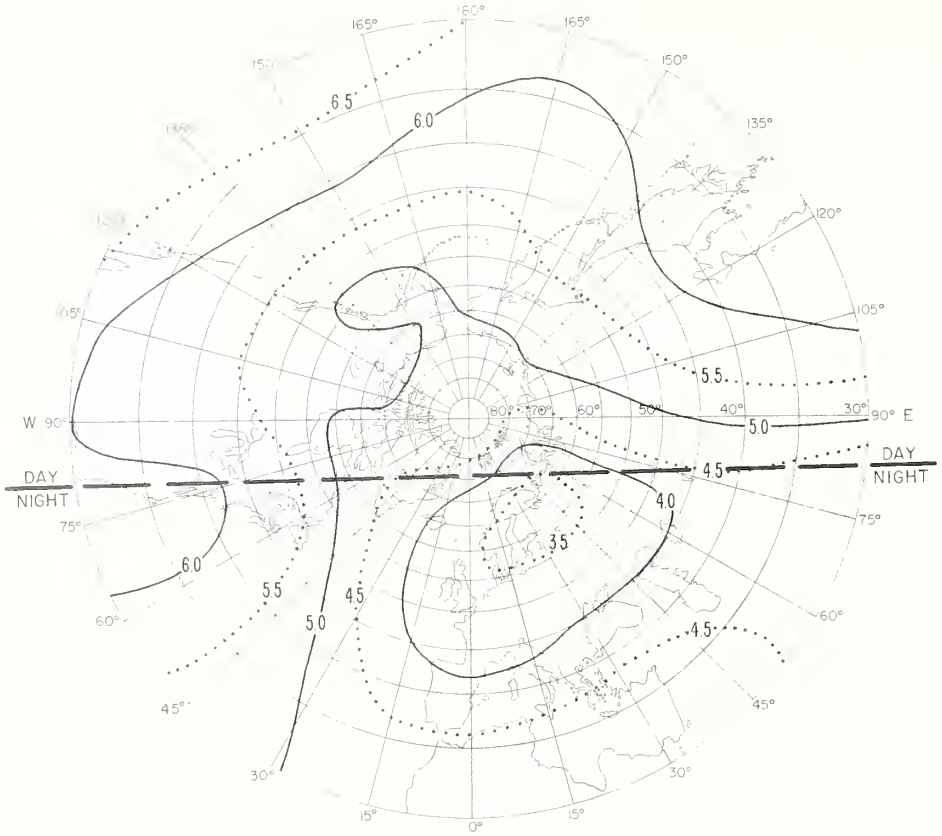


FIG. 13A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

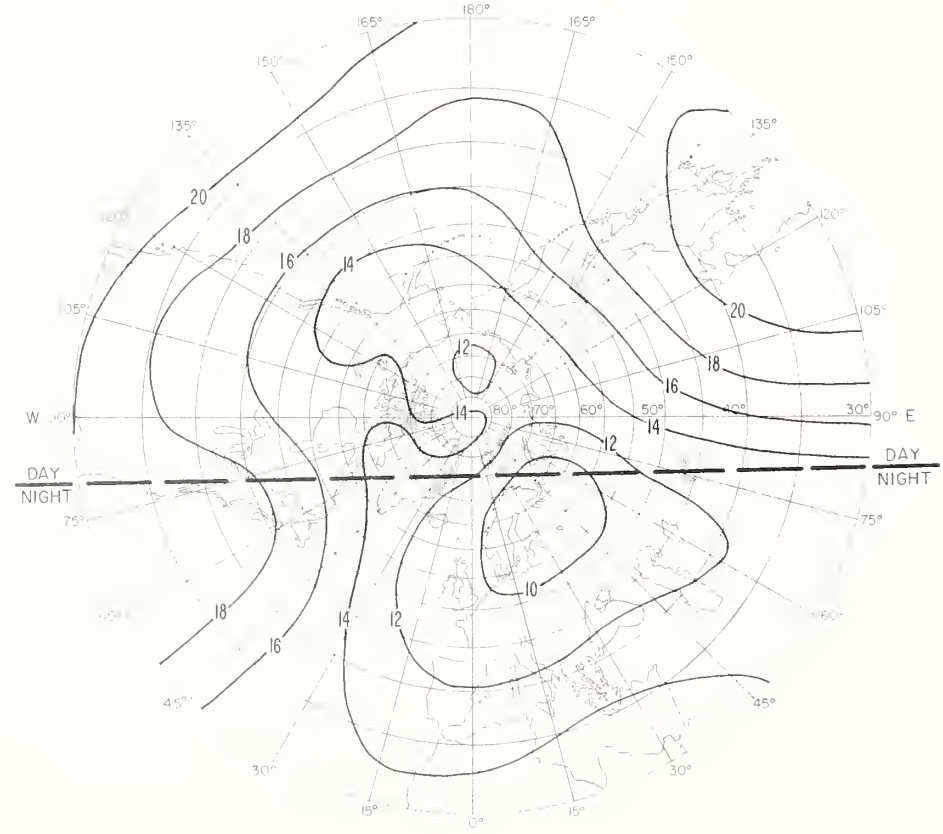


FIG 13B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SOUTH POLAR AREA
AUGUST 1964 UT=00

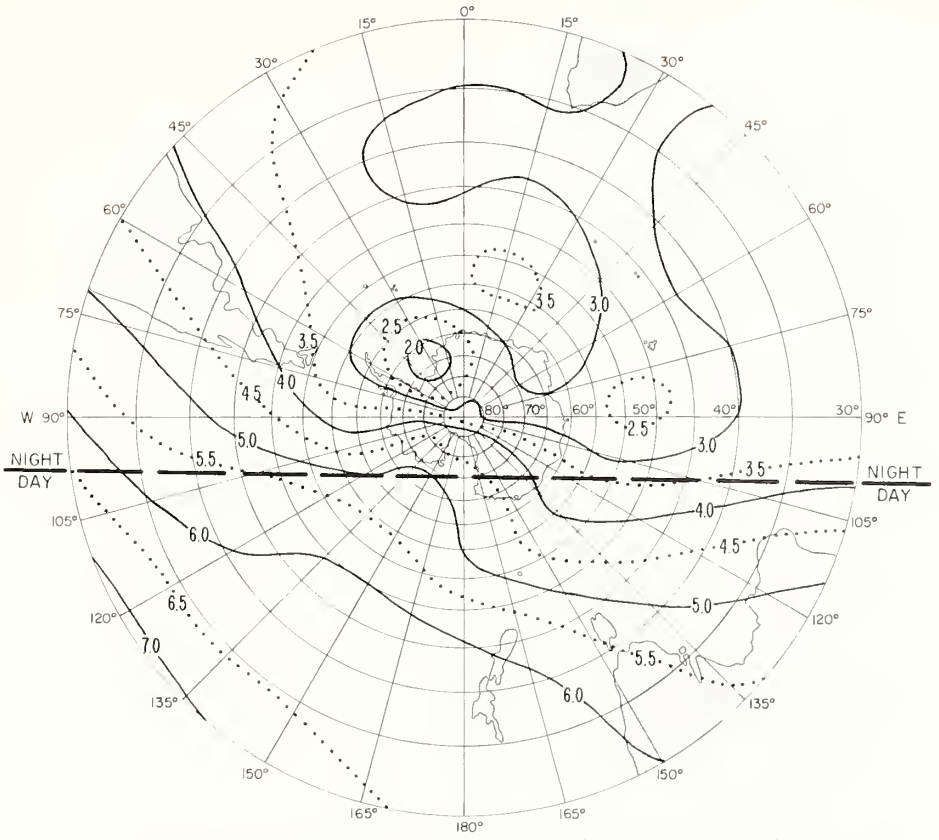


FIG. 14A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

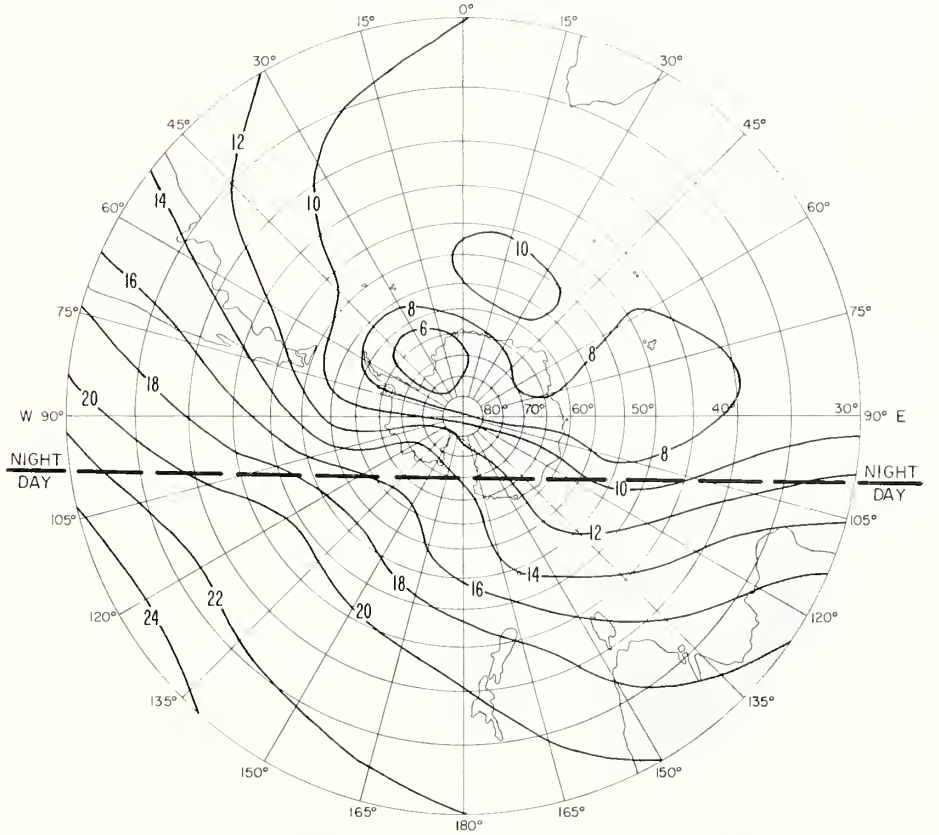


FIG. 14B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

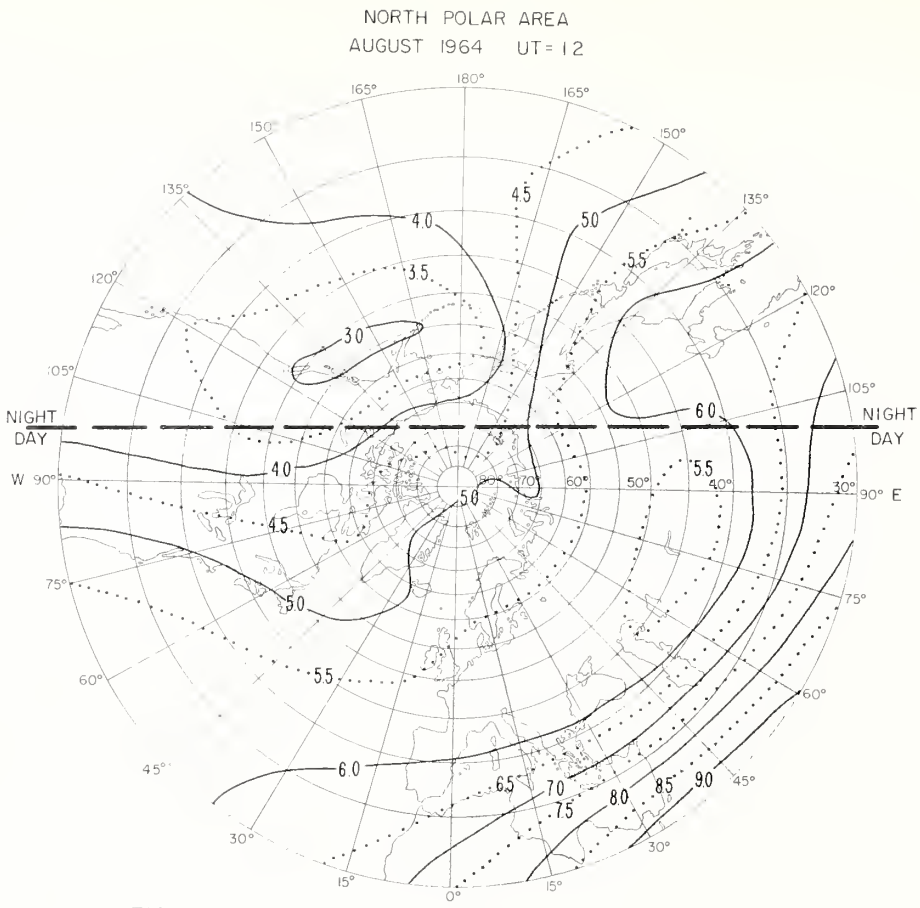


FIG. 15A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

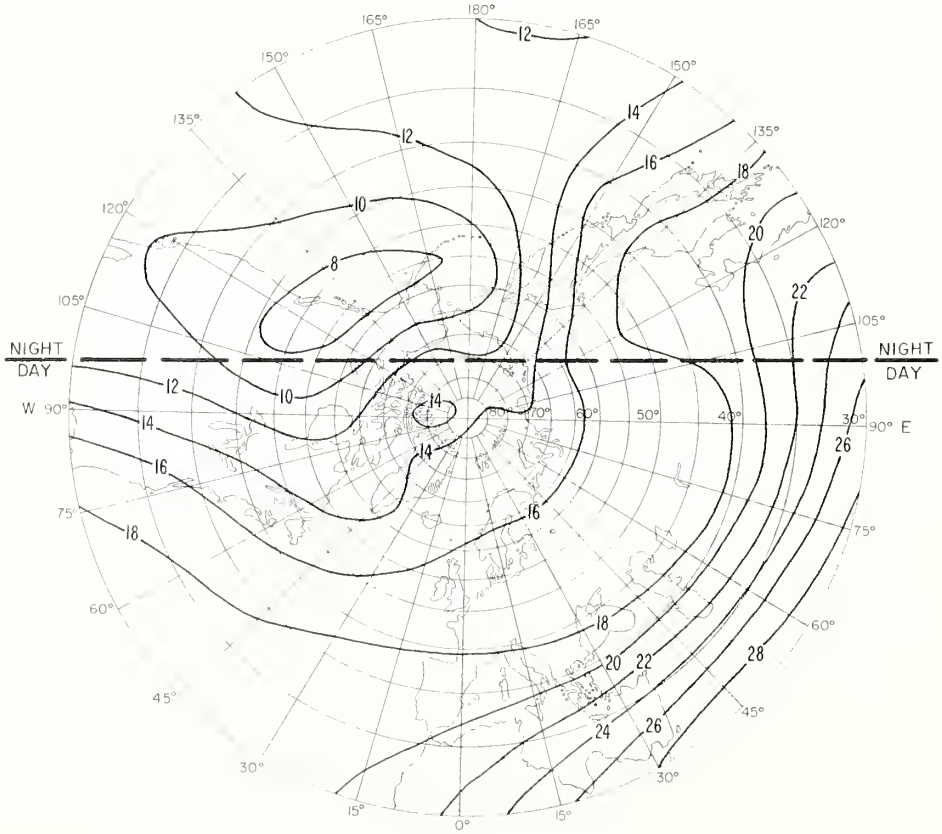


FIG. 15B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

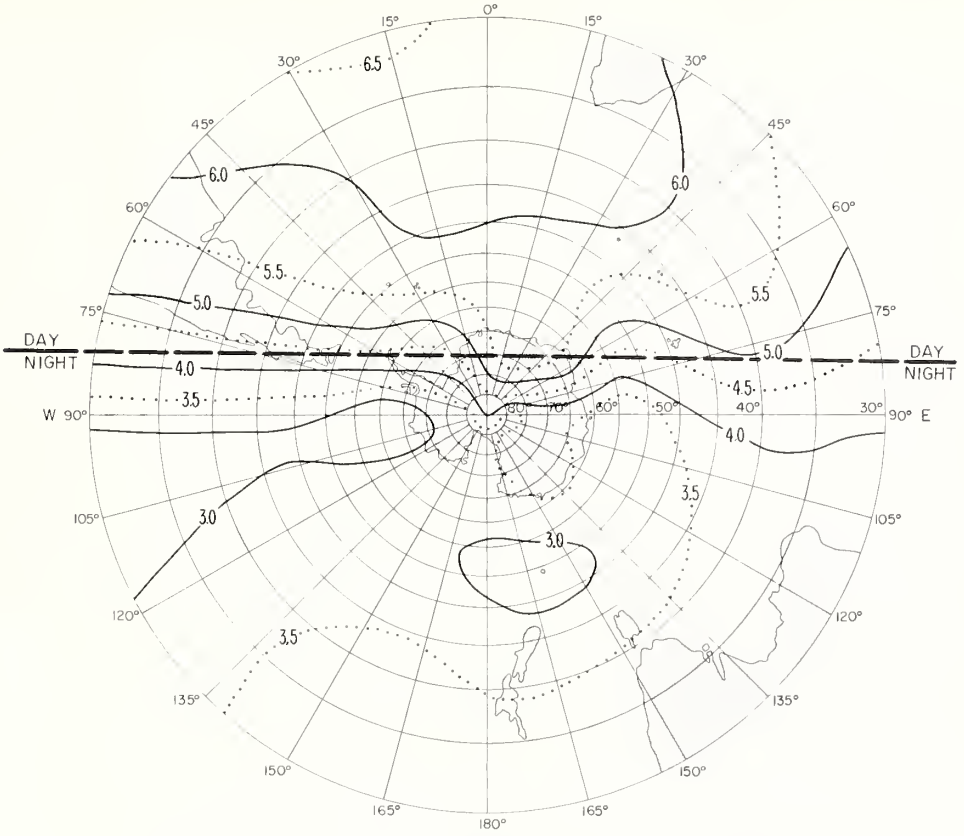


FIG. 16A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

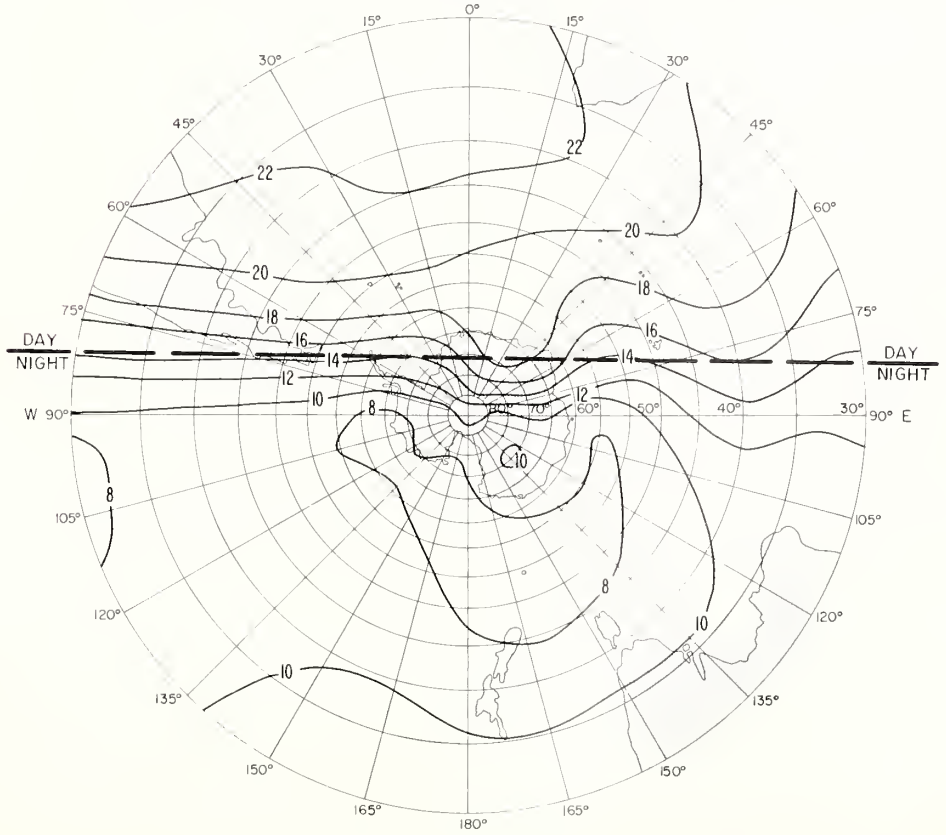


FIG. 16B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

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NG: None.
USAR: None.
For explanation of abbreviations used, see AR 320–50.

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